Faculty of Computer Science and Information Technology
University of Malaya



# EXPENSES CLAIM SYSTEM (ECS)

Lim Foung Wan
WET 990041

Supervisor: Mr. Ang Tan Fong

Moderator: Pn. Nor Edzan Haji Che Nasir

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# ABSTRACT

Expenses Claim System (ECS) is basically a system, which makes the process of claiming faster and easier for the staff of the Faculty of Computer Science and Information Technology (FSKTM). ECS is intended to provide a computer-based system for claiming process. Besides that, ECS provides a user friendly application. Users are able to access to ECS at anytime of the day.

ECS consists of two modules. First, which is the user module, provides the facility of accessing to the claiming form, viewing claim rates of claiming by the University and changing the password. The second module is the approver module. This module provides the facility of viewing claim rates, approving or rejecting the claim application and changing the password.

The system is expected to save time as the details of the staff is automated and this prevents the user from referring to documentation to complete the expenses claim form. The information of the staff is secured as the data and information are kept in a database that is effective and efficient.

ECS is to be developed using Active Server Pages (ASP) and Microsoft SQL Server 2000. Active Server Pages is used to create user friendly interface while Microsoft SQL Server 2000 is for storing information in database. Both works well when integrated.

# ACKNOWLEDGEMENT

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# CHAPTER 1: INTRODUCTION

## 1.1 Project Overview

Primarily, the staff of the Faculty of Computer Science and Information Technology (FSKTM) use expenses claims for reimbursement on reasonable out of pocket money that occurred while conducting university business within Malaysia or in foreign countries.

Claimants are able to claim expenses for meals during the entire duration of the business conducted for university purpose. The calculations for the meals are according to the allocated provision. Reimbursement for hotels and other lodging are supposed to be enclosed with receipts. The service charge, service tax and other expenses for lodging are also allowed to be claimed as lodging claim.

Other expenses such as laundry, telephone, fax, tax, tips and others can also be claimed but receipts have to be provided. Claimants are also allowed to claim for transportation such as taxi, train and bus used during the duration. Claimants are required to state the destination and distance for each trip to enable them claim for traveling expenses.

Basically there are two types of claim which are the claim for the expenses occurred within Malaysia and claim for the expenses occurred in foreign countries. The staff are divided into different categories and the rates for each claim differs according to category and class.

## 1.2 Project Motivation

Technology has been developing rapidly for the past twenty years. Today, almost everyone comes into contact with computers in one way or another. As FSKTM happens to be a faculty in the Information, Communication and Technology (ICT) field, it is best to be the pioneer in providing a Computer Based Information System for staff.

Since the existing manual system of claiming has some weakness, a new efficient and effective system is needed. The new system has to provide the similar service as the existing manual service but with additional and improved features.

The new system is expected to save time as details of the staff are automated and this prevents the user from referring to documentation to complete the claiming form. The information of the staff is secured as data and informations are kept in a database that is effective and efficient to preventing the possibility of losing the data.

In summary, Expenses Claim System (ECS) is a computer based system that supports staff so they are able to carry out their activity of claiming in a fast, easy, safe, effective and efficient way.

## 1.3 Project Objective

It is anticipated that this project will result in the following:

a) Better service

ECS is anticipated to have all the features of the manual claiming system such as the information of claimants, the trip information, the signature of the claimants and the approval of the FSKTM Dean but it comes with some major improvement for better management and process of expenses claim.

b) Claiming process

The process of claiming has to be fast, efficient, effective and easy. The system provides the facility of producing an error free claiming form for claimants. Most of the important information that are necessary for each claiming process are displayed automatically.

c) Reliability and availability

Reliability of ECS refers to its ability to perform task without any error while the availability of the system refers to the probability to operate at any time. These two criteria are important to gain users' confidence.

d) User friendly and interactive interface

It is important for ECS to provide an attractive and user-friendly interface, as users are not always familiar with computers. For an easy usage, the dialog boxes and drop down list is provided while the status of current task are informed to users with pop up message box.

e) Fast access

Expenses claim information and forms can be obtained instantly. Instead of looking high and low for the printed documentation, users are able to access and view the rules and regulations at anytime of their convenience. This helps them save time.

f) Accuracy, integrity and confidentiality

Since the database consists of users' particulars, the security of these data plays a very important part. ECS has to gain the trust of the users by providing an accurate, integrated and confidential system. These are done by providing user name and password for authentication.

## 1.4 Project Scope

### 1.4.1 System Functions

The project consist of two modules:

a) User Module

The staff uses this module. The functions of this module are:

i) Claim Form (within Malaysia, Foreign Country and Advance payment)

Users are required to complete the relevant form electronically. The section where the users' information was previously filled in manually is displayed automatically in ECS.

ii) Claim Rates

Users are able to view the claim rates of the university administration for claiming expenses from University of Malaya's official website.

iii) Password

Password can be changed at anytime by the relevant user when necessary.

b) Approver Module

This module is handled by the approver to update the approval amount for claim application.

i) Approve/ Reject applicant

Approver can either approve or reject the applicant after viewing the full claim information.

ii) Claim Rate according to Staff Category

Users are able to view the rates for each category anytime when they are accessing to the system.

iii) Password

Staff can change their password according to their need.

## 1.5 Problem Definition

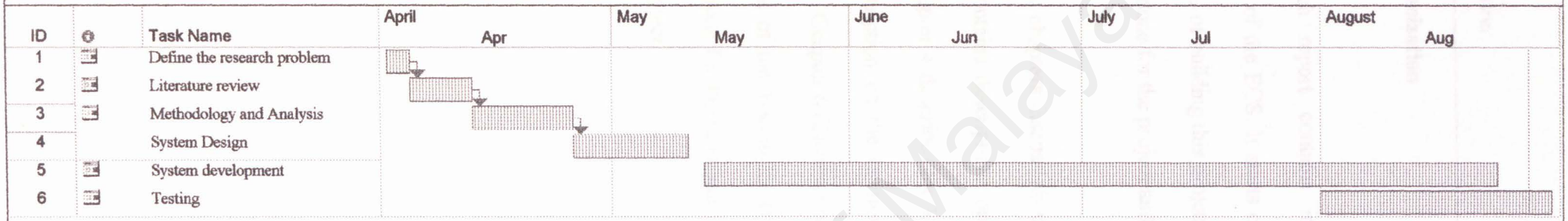
Currently, the staff of FSKTM are using the manual claiming process. The weaknesses of the manual claiming expenses claim procedures have been listed below. It is described in detail in the following chapter. The weaknesses are:

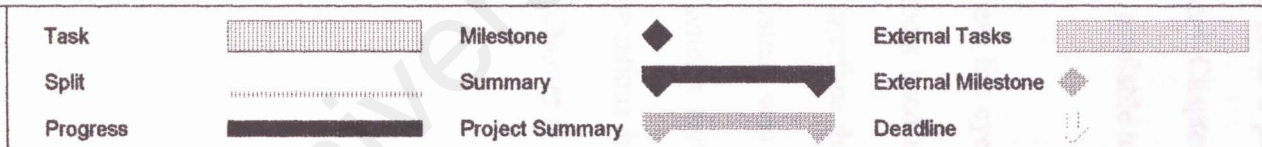
a) The process of completing a form manually is considered a tedious job.
b) Staff are required to fill in the rates according to their category which is a waste of time since they need to refer to the documentation to find out the rate.
c) There is no database for the records of the staff and this leads to an inefficient way for claimants to fill in their particulars.
d) The claiming forms are only available from the office during working hours.

## 1.6 Project Schedule

A project development schedule is highly needed to ensure that effort is distributed within the prescribed time frame to make the best use of resources. Figure 1.1 illustrates the project development schedule for ECS.

Figure1.1 Project Schedule



## 1.7 Report Organization

This research report contains information gathered during the research and development of the ECS. It starts out with Chapter 1 that gives a project overview, the objectives of building this project and scope of the project. Chapter 2 discusses on the research done for the project and the current technology available to implement it.

The next few chapters discuss about the system development life cycle, starting with Chapter 3 contains descriptions on the system analysis tools used and the analysis findings. Chapter 4 describes the logical design and user interface design. Chapter 5 gives a description on the environment in which the system was developed and implemented. Chapter 6 discusses on how the system was actually tested. In chapter 7 an evaluation of the system in terms of strengths and limitations is given together with suggestions for future enhancements for the system. Chapter 8 is conclusion of the whole project.

# CHAPTER 2:
# LITERATURE REVIEW

## 2.1 Overview

The purpose of this section is to review the techniques that are used to collect information about the systems requirements. It is to evaluate and to analyze an existing system that has the similar concept of this system. Evaluation will help in determining the strength and weaknesses of the existing system and measures can be taken to improve the weaknesses. The information will provide a new approach and direction to determine the relevant requirements for the project and lead in producing the best solution.

## 2.2 Information Sources

Fact finding techniques are important to determine the right requirement for the project. A few research criteria have been set as the base to obtain all the necessary information for this ECS system. This set of criteria is laid out so that the amount of information obtained would not get out of hand and would always stay on track with the project. As a result, the following research techniques has been chosen.

a) Analyzing the existing documentation and forms

   The existing expenses claim system of FSKTM was analyzed to determine the required information needed from the staff to complete a claiming form. The rates for each of the staff category had been verified.

b) Research and site visits

Analyze the existing expenses claim system on the web. A study on the attractiveness of the interfaces was done. This techniques helps to determine the appropriate software and architecture that is needed to build the system. Keywords: Expenses claim, online expenses claim cyberspace is able to provide a large amount of information on the criteria of a system.

c) Interviews

The staff of FSKTM and the staff at the staff affairs department of University Malaya had been interviewed to get an overview of the existing expenses claim and the procedures of claiming. Interview helps on finding facts, verify facts and identifying requirement.

d) Documentation room

Existing documentations are taken as a research material for this project. This is because previously documented systems would give a very good picture about how research are carried out and how system designing are done in a proper manner.

e) Reference books

The main areas of interest are books on Active Server Pages and also books on Human Computer Interaction.

## 2.3 Expenses Claim System

Expenses claim is important part of an organization. Through expenses claim, employees are able to reimburse the expenses incurred while on organization business. Almost every organization has the expenses claim system. It is either done manually or electronically.

Manually, an employee has to fill out a claim form with the trip information. Then, it is passed on to a specific person for review with travel regulations, who then in turn has to submit the form for approval from an authorized person. It is then transferred to the treasury department for reimbursement.

For some organizations, expenses claim is done on a web-based application that submits and processes the claim. The reimbursement application is done using the Internet technology. Expenses calim done electronically are considered to be more efficient and effective, Efficient because employee do not have to enter expenses manually and effective as the employee's information is displayed automatically. The web-based application reduces the time to create and process a document. It can reduce the time taken to locate a specific travel document. Employees can just access the Internet easily to locate the document rather than looking through a pile of files.

Expenses can be categorized in a variety of ways. Employees are able to claim for air travel, meals, lodging, personal automobile, insurance, daily travel allowance, foreign exchange and other expenses (e.g: automobile rentals, transportation, telephone, sundry).

## 2.4 The Current Expenses Claim System at FSKTM

The staff of University of Malaya is divided into few categories and grades accordingly to their monthly salary. Thus, rates for each category and grade differ from one to another. Currently the procedures of claiming at FSKTM are as follows:

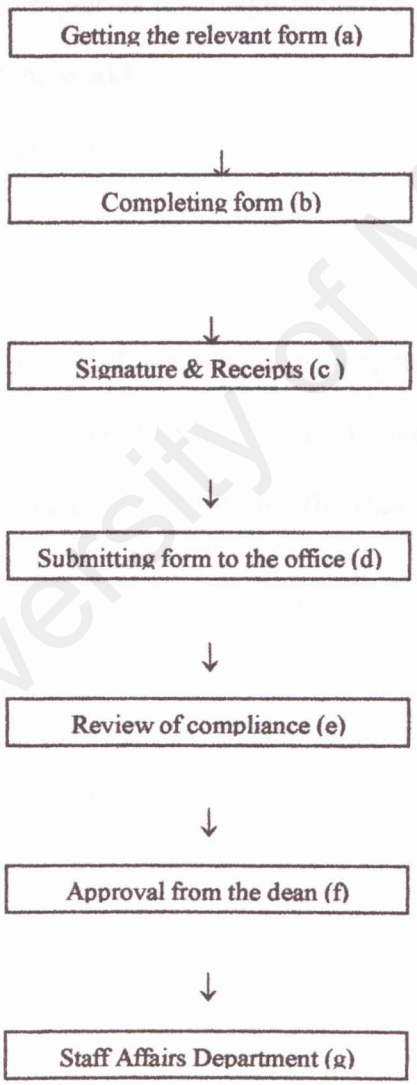



Figure 2.1 Current Claiming Process

a) Getting the relevant form

FSKTM staff is required to get the relevant claim form from the office to claim expenses. There are three types of forms:

i) Claims for expenses within Malaysia

ii) Claims for expenses in foreign countries which includes 90 countries all around the world

iii) Advance payment

b) Completing a form

Claimants are required to fill out the form with the dates of claims, personal information (e.g. name, IC no, Department, Post, Grade, Category, etc) and rates for their category or grade accordingly for the meal, travel and others expenses which occurred manually.

c) Signature and receipts

A form is considered completed when it is enclosed with the signature of the claimants and receipts as prove of expenditure.

d) Submit to office

The form is later submitted to the office with the relevant receipts.

e) Review of compliance

The completed form is reviewed for compliance with claim rules and regulations before being forwarded to the Dean for approval.

f) Approval from the Dean

The Dean then approves the completed form and later the document is submitted to the Staff Affairs Department of University of Malaya.

g) Staff Affairs Department of University of Malaya

Upon approval from the Dean the form is later processed before the reimbursement is made.

The manual process of claiming is tend to have the following weakness:

a) The availability of the form

Staff is required to make trip to the office only during working hours in order to get the relevant expenses claim form. This is an ineffective process.

b) Filling in the necessary particular

Data of the claimants such as name, IC No, Department, Post, Grade or Category has to be filled in manually each time a claim is made. These information tend to be the same for each claim and it is tedious and a waste of time for users to fill these information at all the time.

c) Rates for category and grade

As rates differ from one category to the other, staff is required to fill in the rates accordingly to their category or grades. This is something that claimants cannot remember all the time. All the information will be in a document and sometimes they have to spend some amount of time to locate the specify documents from the file. It is cumbersome to refer to documents always for each claim.

d) Error

Sometimes is a time consuming situation when filling in a document. So there are high possibilities of error. If there are errors during the review of compliance, the form need to be sent back to claimants for correction.

## 2.5 Technologies Consideration

### 2.5.1 Server

The server is the set of technologies that we can use to easily build and deploy component-based server applications without the complexity generally associated with network programming. It is delivered on Windows 2000 and provides support for industry-standard protocols to integrate with existing UNIX and mainframe systems. Microsoft Active Server technologies make the development, deployment, and maintenance of robust Internet and corporate network applications faster and easier.

These technologies include:

- **Internet Information Server (IIS)-** a powerful platform for dynamic Web applications.
- **Microsoft Transaction Server (MTS)-** delivers mainframe-style reliability and scalability to multi-tier business applications.
- **Directory and Security Services-** provides secure access to information and a common view of the network for applications that run on multiple client platforms.
- **Data Management services-** for standards- based access to enterprise- wide data using ODBC, OLE DB and Microsoft SQL Server.
- **Network Integration Services-** integrates a diverse set of network protocols including TCP/IP, HTTP, DCOM and SNA Server.
- **Windows 2000 Server-** the foundation for Active Server.

### 2.5.2 Hyper Text Markup Language (HTML)

To publish information for global distribution, one needs a university understood language, a kind of publishing mother tongue that all computers may potentially understand. The publishing language used by the World Wide Web is HTML (from HyperText Markup Language).

HTML gives authors the means to:

- Publish online documents with headings, text tables, lists, photos, etc.
- Retrieve online information via hypertext links, at the click of a button.
- Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
- Include spreadsheets, video clips, sound clips and other applications directly in their documents.

Most people agree that HTML documents should work well across different browsers and platforms. Achieving interoperability lowers costs to content providers since they must develop only one version of a document. If the effort is not made, there is much greater risk that the Web will develop into a proprietary world of incompatible formats, ultimately reducing the Web's commercial potential for all participants.

Each version of HTML has attempted to reflect greater consensus among industry players so that the investment made by content providers will not be wasted and that their documents will not become unreadable in a short period of time.

HTML has been developed with the vision that all manner of devices should be able to use information on the Web: PCs with graphics displays of varying resolution and color depths, cellular telephones, hand held devices, devices for speech for output and input, computers with high or low bandwidth, and so on.

With its high degree of interoperability, the use of HTML in the Expenses Claim System ensures that differing devices can easily use documents created across the entire office environment.

### 2.5.3 Visual Basic Scripting

Microsoft Visual Basic Scripting Edition (VBScript) is a subset of the Microsoft Visual Basic language. It is implemented as a fast, portable, lightweight interpreter for use in World Wide Web browsers and other applications that use Microsoft ActiveX Controls. Automation servers, and Java applets. VBScript is currently available as part of Microsoft Internet Explorer and Microsoft Internet Information server.

When used in Microsoft Internet Explorer, VBScript is directly comparable to Microsoft JavaScript (not Java). Like JavaScript, VBScript is a pure interpreter that processes source code embedded directly in the HTML. VBScript code, like JavaScript, does not produce standalone applets but is used to add intelligence and interactivity to HTML documents. For programmers who already know Microsoft Visual Basic, VBScript is a valuable alternative to JavaScript in activating Web pages.

There are three separate classes of objects available within VBScript:

- Objects provided by the VBScript engine
- Objects provided by Internet Explorer
- Objects provided by the Web page author

The VBScript engine provides the core run-time functionality- a subset of the full Microsoft Visual Basic language – including a minimal set of basic objects. The vast majority of objects used in scripting are provided by Microsoft Internet Explorer. In general, anything that is specific to the Internet is provided by Internet Explorer, and anything that is generally useful is provided directly in VBScript. The Web author can insert additional objects through the <OBJECT> HTML tag.

The primary motivation for using VBScript in the Expenses Claim System is as an alternative to JavaScript and Java. If for instance, an application for the Expenses Claim System requires the use of a scripting language, VBScript can be used if the application is written to support Microsoft ActiveX Scripting , since doing to will allow it to host VBScript. An important bonus to this is because ActiveX Scripting is an open standard, the application can also host any other language that is written to that standard.

### 2.5.4 Active Server Pages (ASP)

Active Server Pages (ASP) is the latest server-based technology from Microsoft for building dynamic and interactive web pages. The basis of ASP is the Microsoft's Internet Information Server (IIS) software.

In fact, ASP is not an application. It is a VBScript and Jscript interpreter that is integrated with IIS, together with an interface for other custom components. It is also able to include

other web pages components like ActiveX controls and Java Applets. Therefore, ASP is considered as a glue technology, which binds together other various server-based systems to help build interactive web pages.

Active server Pages is being considered for ECS project because of its main features especially in the web server technology. These reasons are as follows:

- Is suitable for publishing and collecting data on the web
- Provide a way for building secure transactions, server-based applications and web sites
- Works together with Windows NT and IIS to provide a comprehensive set of key software technologies which enable secure exchange of information over public networks, access control to server resources and confident identification of server and client
- Provide Active Database Object, one of the Active Server Components allows easy but powerful connections to be made to almost any database system for which an Open Database Connectivity (ODBC) driver is available
- Has pre-built Active Server Components which provide plug-in objects that will perform specific tasks
- Can interact with almost any existing dynamic web page technology such as CGI (Common Gateway Interface) ISAPI ( Internet Server Application Programming Interface) and scripts written in PERL, Python and Awk
- Is suitable for building multitier Internet and intranet applications

- Supports client-server programming. Furthermore, the combination of ASP. Client-side scripting and objects can be used to create client/server application
- Is able to create client side code dynamically on the server

## 2.6 Existing Expenses Claim System

There are a vast collection of existing Expenses Claim Systems on the web. Although almost all the organization provides an electronic expenses claim application but there is a need for the claimant to print the form before attaching it with their signature as prove and later submitting it to the authority for approval.

Providing an electronic form transfer would be a heavy task, as it is not secured. Electronic form transfer does not clarify the authentication of the claimants and electronic form transfer means there is no attached receipts, which are the only prove of expenditure.

Few example of the expenses claim that is available on the web are as follow:

a) AISB expenses claim form [1]

This is a very simple type of expenses claim. It is only stated here the instructions about whom the signed form should be sent to. It is strictly stated here that the claims sent by electronic mail is not accepted. Claimants are required to enclose

receipts or any other concrete evidence of expenditure. Claimants are not able to key in the data electronically. The form has to be printed out before completing it. There are no facilities of the claimants viewing the rules and regulations and it is not user friendly. The completed form needs the claimants' signature. It is stated clearly that claimants are not allowed to send claims by electronic mail and only signed claims are accepted.

b) AgentLink expenses claims [2]

Users are able to see the rules and regulations of the claims on this web page. It provides some general observation for claiming to claimants. Claimants are required to download the expenses claim form. The form is available in the PDF version and MSWord version, which they are familiar with. It is waste if time to download the relevant form. Once the form is download, claimants are able to key in their particular electronically. They are required to sign and provide evidence for the expenses. The system is not user friendly as there is no instruction on how to complete a form. There is no drop-down list box to choose the available options or commands button to print the completed form.

c) Appendix 4: Expenses claim [3]

This web page is attractive but its static. The claim procedures and rules are stated on the web page. The expenses claim form is in the Microsoft Excel version and claimants are required to download it. The site also provides other alternatives such as Works or Lotus if the claimants are not able to work with the Excel

format. They are required to request for the service. A brief description is given on how to complete the form. The expenses claim form needs detailed information. They are required to fill in the particulars in a text box. The web page is quite attractive compared to others. It is stated here the claim procedures and rules. Claimants are required to download a Microsoft Excel format claim form. A brief description is given on how to complete the form.

d) Claim for Traveling Expenses [4]

Claimants are not required to download the claim form as it is available once one visit to the website. Claimants are given the option of getting online help in order to fill in the form. It is also linked to the rates of the claims. Claimants are able to complete the form electronically before printing. Any problem with printing they are able to seek for online printing help menu. A complete form is a form that has the signature of the claimants and approver. Claimants are not required to download the claim form as it is available once the web page is visited. This page is linked to the online help and to view the rates. Claimants who are having problem in printing out the form can visit the online printing help menu. A complete form is a form that has the signature of the claimant and approver.

e) ANU CABS Council Members' expenses claim form [5]

This is yet another simple page where claimants are not required to download the form. The form is used when seeking claim for living expenses and traveling costs. The form does not require the detailed particulars of the claimants. Only the

rates for travel distance stated accordingly to the power of the car engine. It is necessary for claimants to attach receipts as prove of expenditure. This is another simple page where claimants are not required to download the form. The form is used when seeking claim for living expenses and traveling costs. The policy of claiming is stated here and it is necessary for claimants attach receipt as prove of expenses. Claimants are not required to download the claim form as it is available once the visit the web page. This page is linked to the online help and to view the rates. Claimants who are having problem in printing out the form can visit the online printing help menu. A complete form is a form that has the signature of the claimants and approver.

f) Acadia University Travel Expenses Form [6]

Users are able to see the general information and regulations of the claims on this web page. There is a link to online travel expense form. Users have to fill out the online travel expense form. Firstly, users have to key in personal information such as name, address, position, e-mail address and etc. Next, users have to key in the expenses entry and the form will automatically calculate the total expenses. After that, an expenses report will be shown. Once the online form have been completed and submitted, the form is electronically forwarded to supervisor for approval. When the supervisor has approved the claim, user will be notified that it has been approved and the Business Office will receive the approved claim electronically. The Business Office will process your payment after receipts and documentation have been received via interoffice mail and have been payment

after receipts and documentation have been received via interoffice mail and have been matched to user's claim. Users also have to send all receipts and other documentation in the specially designed Travel Claim Envelope (available from the Business Office) via interoffice mail to the Business Office.

g)Queen's University Travel Expense Claim [7]

This is a simple page where claimants are not required to download the form. Claimants are able to complete the form electronically before printing. There is a link to summary of travel expense policy. Claimant must attach original receipts to support claims made for accommodation, public transportation, and other individual expenses greater than $10. Credit card statements, slips and cancelled cheques are not acceptable as receipts. Receipts are required whether claimants are making a claim for reimbursement or a donation. It is not necessary to provide supporting documentation for meal allowances, use of private car, or individual expenses less than $10. When making travel arrangements, the claimant is responsible for obtaining the most economical mode of travel and accommodation available within reason.Travel Policy does not permit reimbursement of the following costs: traffic fines, parking fines, personal expenses, personal entertainment, expenses of spouse and family.

h)CSUPERB Travel Expense Claim [8]

The expenses claim form is in the Microsoft Excel version and claimants are required to download it.A travel expense claim form shall be completed and the

original, signed copy accompanied by appropriate original documentation (e.g. airline ticket receipt) shall be submitted to travel clerk. For help on filling the form, there is a link to travel expense claim form tips.

i)CMS Travel Expense Claim [9]

The form is available once one visit the website. The form is also available as printable PDF version and postscript version where the users can download it. The claim procedures and rules are stated on the web page. It is necessary for claimants to attach receipts as prove of expenditure. A completed form, with all required receipts must be sent to the address stated at the web page.

j) Signifo Expenses [10]

There is a login page for the users. The user name is the user's email address and the address must include the @ symbol and the full domain name. The first time user log in to Expenses the password is the one sent to your email address. The password is case sensitive, so user will need to type capital letters as capitals. After the first log in, user will be asked to change the password. If user ever need to change the password once user have logged in, user can do so by clicking the 

button next to the name on the welcome page. Click the 'submit' button once you've entered your user name and password. The next page you see should be either the Change Password page, or your Welcome page. If users do not enter their username or a password, users will get either a pop-up message or a message in red text advising that

**"Your username or password is incorrect. Please try again"**. If users have entered the correct user name and password and receive the error message **"Your username has been locked out. Please contact your administrator"** users' account has been disabled. Users have to contact the administrator to have the lock on user account removed so user can use the system.

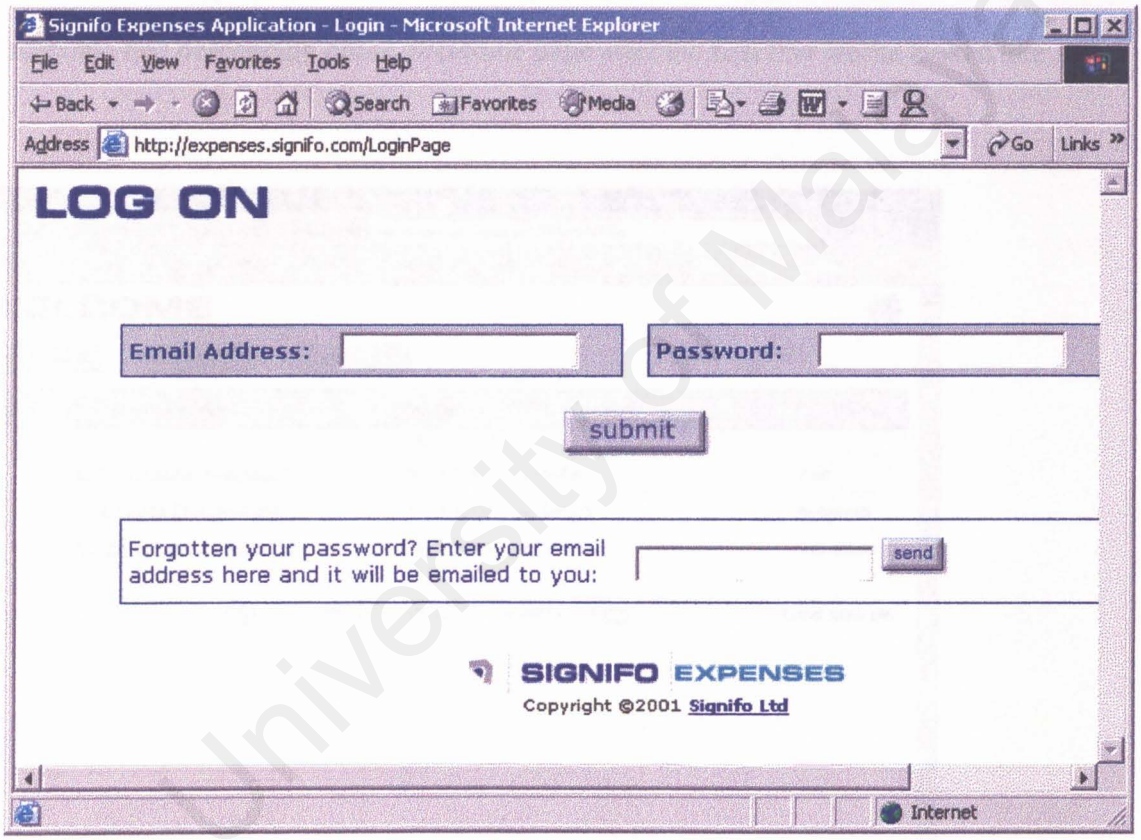
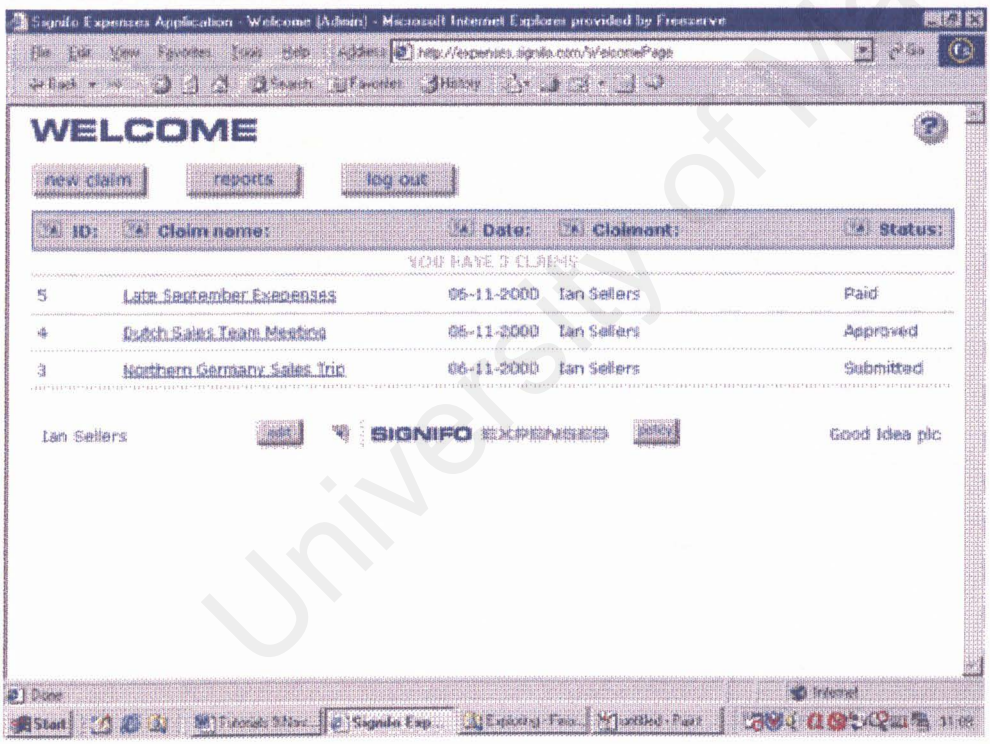



Figure 2.2 Signifo Expenses Login Page

There is user tutorial that have information on how to use Expenses. When user logged on the first time and completed his password he reached the Welcome page. This is the

screen that user always see once user has logged in to Expenses. At the top of the screen user can perform a number of functions.

Each claim user enter will appear in summary on Welcome page. The status will change as the claim is processed and it is from here that users can monitor the progress of their claims. Users can always view their claims by clicking on the claim name or the claim ID. Users can order their claims by pressing the toggle button. This will sort their claims in ascending and descending order. Welcome page after the first few weeks looked like this:




To begin a new expense claim simply press the 'new claim' button this will bring up a new claim header and will allow users to start entering a claim. The 'reports' button gives users access to a menu of reports that allows users to look at their previous claims, for instance to analyse spending by client.

## 2.7 Summary

Overall this chapter reviews on the existing systems. The weaknesses of the existing system are detected. The comparison between the systems helps to determine the features of the new system.

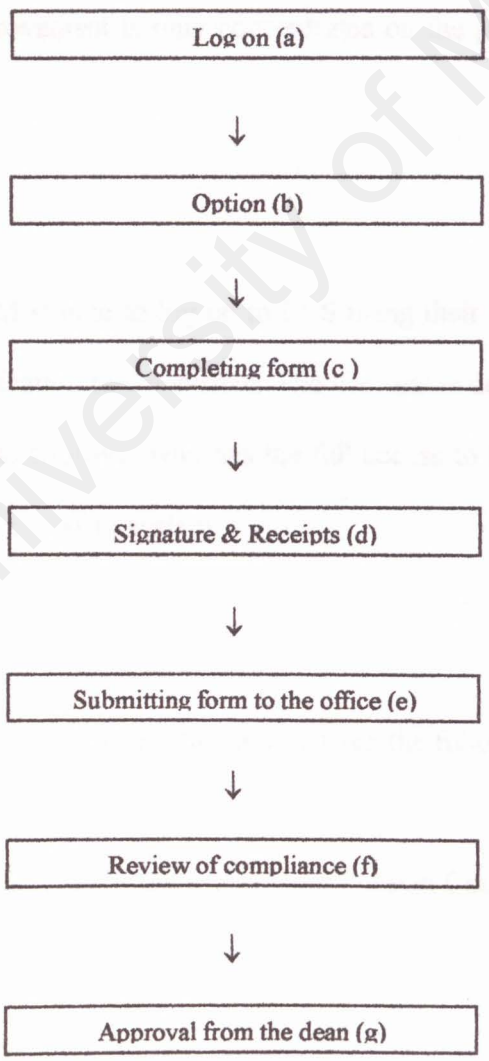
It focuses on the specification that has to be the content in the new system, which is necessary for successful system development. The criteria of a user interface and the type of modeling in use has to be determined.

# CHAPTER 3: METHODOLOGY

## 3.1 Overview

Methodology is the process of describing the methods used to develop ECS. The planning in developing the ECS to be a data application that is to be used at FSKTM is according to the development strategy and the project procedures.

## 3.2 Expenses Claim System (ECS)



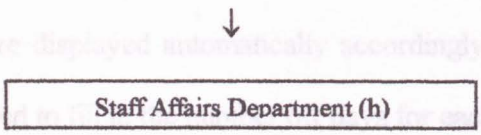



Figure 3.1 ECS Claiming Process

ECS is an online system. The procedures from (a) to (f) are done manually at FSKTM. As the Staff Affairs Department of Malaya prefers the claim to be on paper form rather than electronic form, ECS is an improvement of the existing system at the stage (a) to stages (c). Thus, the improvement is only concentrates on the processes that involve the staff.

a) Log on

Users/ Staff of FSKTM is able to log on to ECS using their user name and password in order to get authentication to the system. The user name determines the category of the user. Either it is the approver who has the full access to the system or the normal user, who has a partial access to system.

b) Options

Once the user's identity is identified, the user is given the following options to link to:

i) Expenses Claim Form (within Malaysia or Foreign Country)

At this section, user's particular such as name, IC No, departments, category and the rates are displayed automatically accordingly to their category. Thus, users are required to fill in the number off days for each claim.

ii) Claim Rates

Users are able to view the claim rates for each category/grades anytime.

iii) Password

Users are given the options to change their password anytime to protect their authentication according to their need. In short, they can change it anytime.

The following procedures follows the steps of (c )- (g) in the manual system.

### 3.3 Improvement of the ECS compared to the manual system

ECS has the following improvements:

a) Availability of form

ECS provides an electronic document. Claimants are able to access to the system anytime to get the relevant expenses claim form. ECS has high availability.

b) Data

User's data such as name, IC No, department, post, Category/ Grades are displayed automatically anytime, as users do not need to key in the same particulars recursively

for each claim. This is efficient, as users do not have to manually enter those data manually.

c) Rates

Rates are also displayed automatically according to the user's category or grade. This prevents errors and the user just has to key in the number of days for each type of claim to complete the form. This prevents as the chances for the rates to be wrong.

d) Time Saving

The data and rates, which are displayed automatically save the time. It helps to decrease the time taken to process a form. The quicker a claimant submits the expense claim, the quicker they will be reimbursed.

e) Documentation

ECS provides electronic documentation, which consists of rules and regulations and claim rates. Instead of looking through pile of files, users can just access ECS to locate the document which is much more faster and convenient.

f) Dates

Dates of claims are also displayed automatically.

g) Interface

ECS also provides a user-friendly interface. It consists of drop down list, attractive menu/ interface and dialogue boxes that interact with the users and the system.

### 3.4 Development Strategy

ECS is to be developed under the prototype modeling. Prototype cater to the "I'll know what I want when I see it" way of thinking. This is the common characteristic among users. The prototyping approach allows a quick development of the system model. It is an interactive process where developers and users who are in a close relationship to achieve what they want in the system.

Prototyping is a recursive process. It is known that users do not know the requirements before they see the implementation. So, users are tending to change theirs mind anytime. Prototyping allows users to see the models and make changes. Thus, prototype interactive allows gradual development of a system.

As users are together with the developers for every development of the system and the changes are according to the user, the system tends to be more real to the users. Since they are able to see, touch and experience the system at the each stage of development, the system tends to be more familiar.

Prototype model allows an early detection of error and this prevents the error at the last stage that could be time and cost consuming.

### 3.5 Functional Requirement

Functional requirement is the features that have to be included in a system to satisfy the need of the system. It describes the interaction between system and environment and how a system interacts with request.

a) User Module

i) Main Menu

This is an introduction to the Expense Claim System of FSKTM. Users are required to key in their user name and password in order to access the system. The username will determine the type of access for the specific user.

Once the user's identity has been identified, the user is allowed to link to:

- Expenses Claim Form (within Malaysia or Foreign country)

  This section enables the users to claim for their expenses by completing the form with user's name, IC No, department and etc rates are displayed automatically in the text box. The dates of the claim are displayed in the combo box.

- View Claim

  Users are able to view the previous claim when they are accessing to the system.

- Claim Rate according to Staff Category

  Users are able to view the rates for each category anytime when they are accessing to the system.

- Password

  Users are given the ability of changing their password for their authentication according to their need.

b) Approver Module

This module is handled by the approver to update the approved amount for claim application.

i) Approve/ Reject applicant

Approver can either approve or reject the applicant after viewing the full claim information.

ii) Claim Rate according to Staff Category

Users are able to view the rates for each category anytime when they are accessing to the system.

iii) Password

Staff can change their password according to their need.

### 3.6 Non Functional Requirement

Non- functional requirement is the additional features that attribute to the system that may limit the proposal solution's boundaries.

a) Security

This requirement is to allow only the valid users to get access to the system. User name and password determine the type of access of the particular user.

b) Interface

Graphical User Interface allows the manipulation of the graphic presentation that is displayed on the screen. It is a representation of the user's input and output.

c) User friendly

This facility helps the users to be comfortable with the application. Users are allowed to perform the operation in an easy way.

d) Response time

The average delay between a request and response has to be fast.

e) Portability

The solution must ensure the capability of the application system to operate on various platforms regardless of manufacturer or operating system. This is important to identify the portability of the components in operating on various platforms by either without any modification, recompiling, reconfiguration or redesign of the components.

f) Usability

The application systems must be easy to use. They can enhance and support rather than limit or restrict business processes. Human interfaces need to be intuitive and consistent with other application systems in the environment and within themselves.

### 3.7 Development Tools Analysis

An analysis was carried out on the development tools for the system. After reviewing and analyzing the requirements, the tools for developing the system are decided. These tools include the entire platform, servers, development software and programming language. Besides considering the suitability of the tools to the requirement, the tools used must be able to support each other. The following session explains all the tools used in the system.

### 3.7.1 Server and the Platform

In the beginning of literature review, the analysis was more on the Microsoft technologies. This is because Microsoft technologies proved so far, there is no problem in supporting a big system. Most importantly, the technologies come from a same producer like Microsoft, are also believed to be able to work together in an environment. In the analysis for the entire platform, the Microsoft products are used as the main technology producer.

#### 3.7.1.1 Windows 2000 Server

Windows 2000 Server is used as the main server operating system. The main reason for using 2000 file systems is its user friendliness and stability features. The 2000 server provides the 2000 authentication and files system that can be used in the system's data repository components.

#### 3.7.1.2 Internet Information Server (IIS)

IIS is chosen as the web server mainly because it can be well supported by the Windows NT operating system. Besides its GUI feature, IIS can also provide the basic web authentication for the web application that is used in the system.

#### 3.7.1.3 SQL Server supported by ODBC

The robustness and stability of the SQL Server in working with other Microsoft components contributes to the reasons that it was chosen as system's database platform.

In comparison to Microsoft Access, SQL server can handle more burden of database processing even in a distributed environment. In the distributed environment, the database in the SQL server can easily mapped to the other processing server through Open Database Connectivity (ODBC).

3.7.1.4 Microsoft Index Server

An index server is needed to perform query search for data repository. As Microsoft Index Server can work effectively with the NT file System, it is chosen as the main query server for database.

3.7.1.5 Internet Explorer 6.0 (IE6)

A browser is needed for the development of web application. Internet Explorer 6.0 or higher version is selected as the only browser being used in the project. It supports most of the HTML scripts, and most importantly, could support the ActiveX controls that are also used in the project.

### 3.7.2 Development software

3.7.2.1 Notepad and Visual Interdev

Notepad or Visual Interdev becomes the editor for the ASP coding. The use of Notepad as an editor is not as good as the Visual Interdev, which provides more features that are helpful for ASP coding. The Notepad, however, is available in most of the Windows workstation.

3.7.2.2 Windows 95 Personal Web Server

Besides developing the web application on the IIS, the application could also be developed on a Windows 95 Personal Web Server (PWS). The PWS can be easily installed into the Windows 95 PC. It is used because it could not only work in Windows 95 operating system, but could also develop the ASP web pages offline. The offline development could save cost and time of development.

### 3.7.3 Programming Language

3.7.3.1 Active Server Pages

Active Server Pages is the script that runs in the Microsoft web server. Its function is to generate HTML scripts for the client browser. Compared to CGI, ASP is easier to be used and is more flexible in changing codes as no compilation is involved. It is, therefore, selected as the main development tools for the server run script.

3.7.3.2 ActiveX DLL and Components

ActiveX DLL files can be made to become an ASP component that can be run in the web server. In this project, however, no ActiveX DLL file is created. Instead, there are two downloaded ASP components are used as a tool in the solution. The first component is AspHttp.dll file, which is registered in the server and used to ping the existence of the server in the Internet.

3.7.3.3 Hypertext Markup Language (HTML)

In order to develop a web base application, the HTML script is needed. HTML is the basic tool that is necessary for the development of client's browser run script.

3.7.3.4 VB Script

Besides HTML, VB Script is another selected tool for development of client's browser run script. Its function is to make the web application more dynamic. Although VBScript is still new if compared to JavaScript, it is, however, proved more reliable in working with the ASP.

3.7.3.5 ActiveX Control with Visual Basic 5.0

ActiveX Control is a downloadable object that could be run in the client browser. It provides many powerful and dynamic features for the web application. In the project, Visual Basic is selected as the development tool for all the ActiveX Controls used in the application.

3.7.3.6 Structure Query Language (SQL)

SQL was the basic database query language that is used for the application. It is simple to use. Most importantly, it is also well supported by the SQL Server and other Microsoft technologies.

# CHAPTER 4:
# SYSTEM DESIGN

## 4.1 Overview

System design is the specification or construction of a technical, computer based solution for the system requirements. This phase concentrates on design of the system's structure and Data Flow Diagram (DFD).

## 4.2 Overview of ECS

Users of ECS are linked to all the module using the hypertext links. Figure below shows the structures of the ECS.

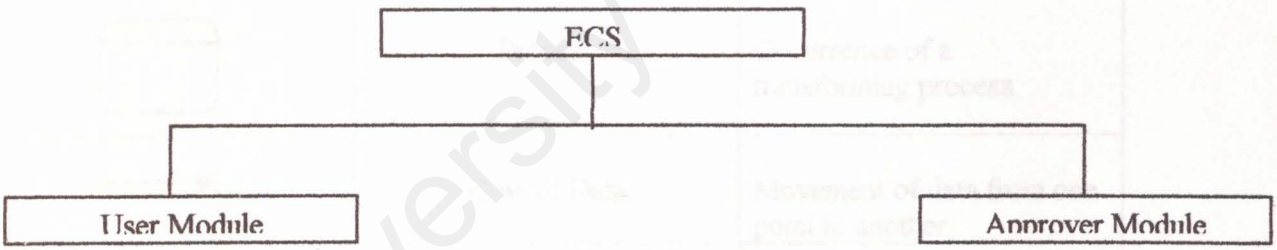



Figure 4.1 Overview of ECS module

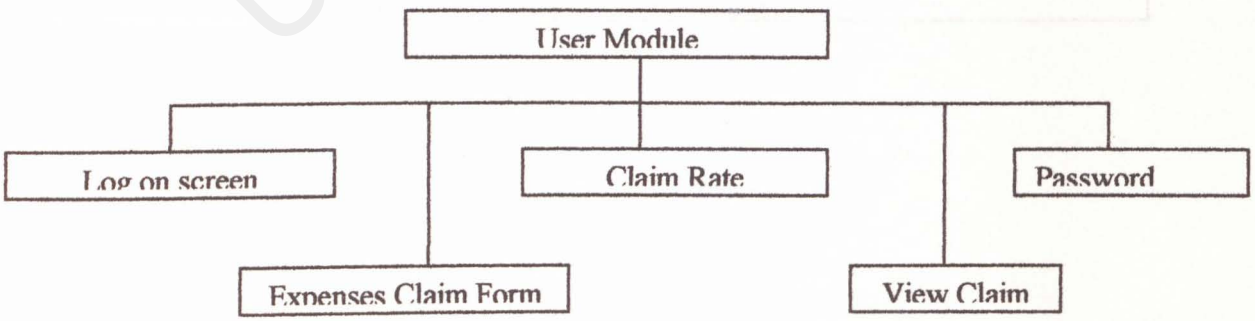



Figure 4.2 ECS user module

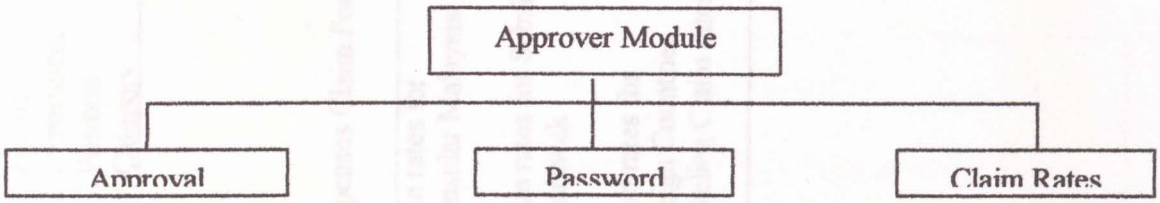
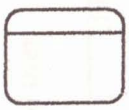
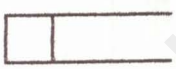



Figure 4.3 ECS approver module

## 4.3 Data Flow Diagram of ECS

DFD is a graphical representation of the data processes of the system. It uses the combination of four symbols to create a pictorial depiction. The four symbols are stated below:

| Symbols | Meaning | Description |
|---|---|---|
|  | Entity | Source or destination of the data |
|  | Process | Occurrence of a transforming process |
|  | Flow of Data | Movement of data from one point to another |
|  | Data Store | Represent the storage of the data |

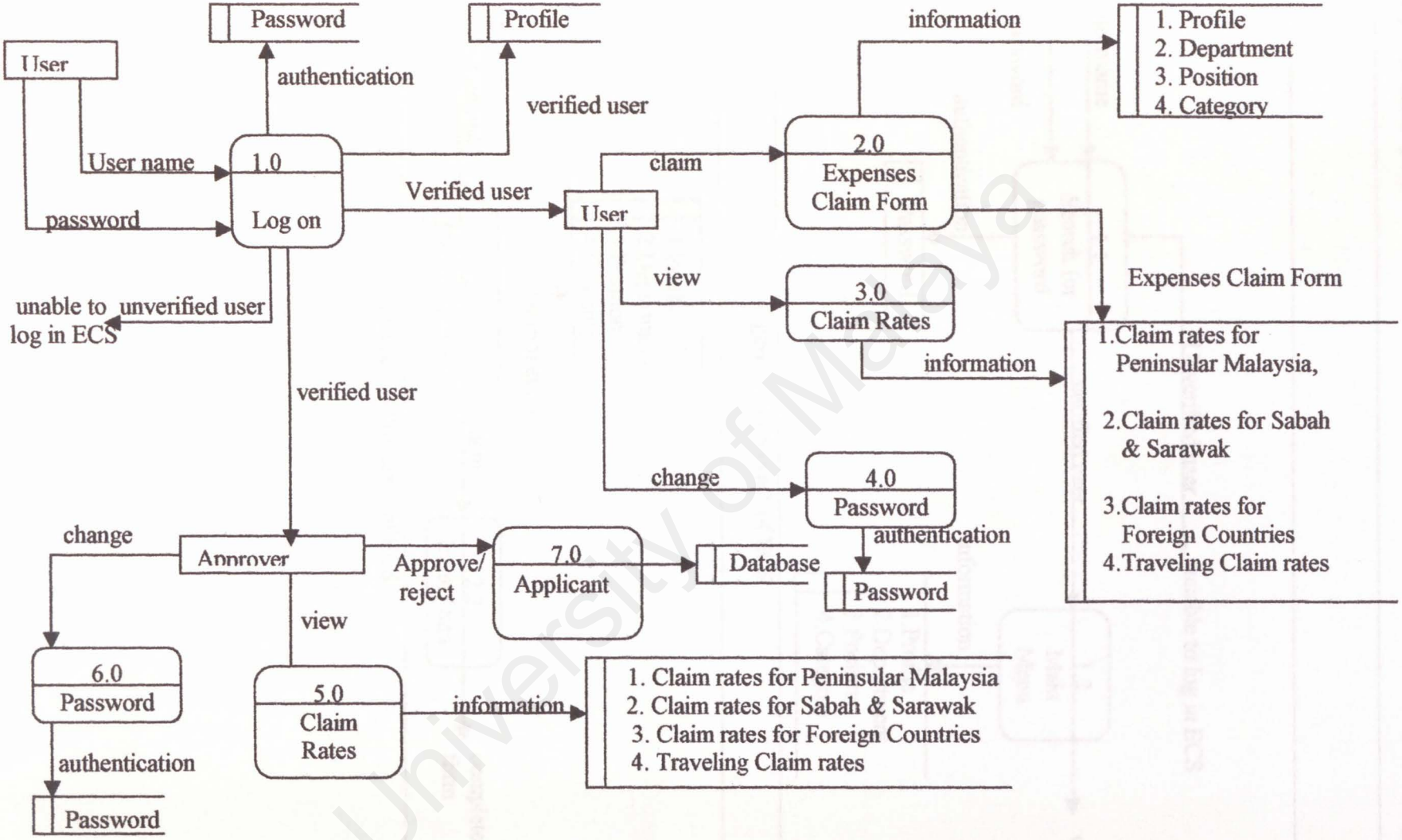



Figure 4.4 DFD of ECS

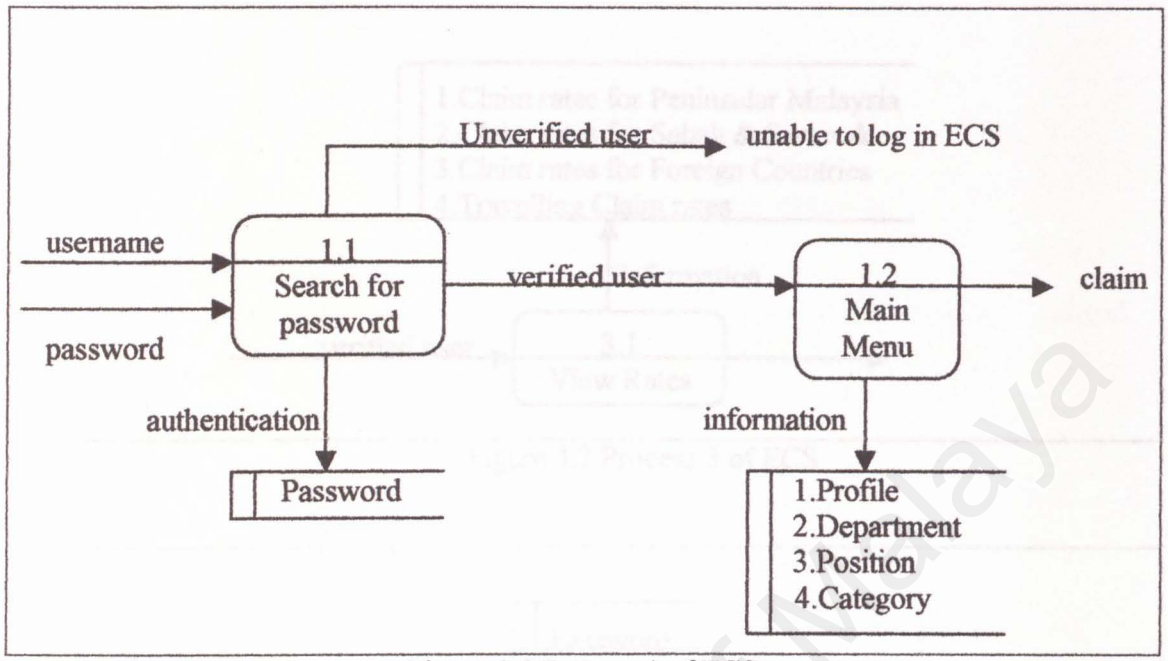



Figure 4.5 Process 1 of ECS

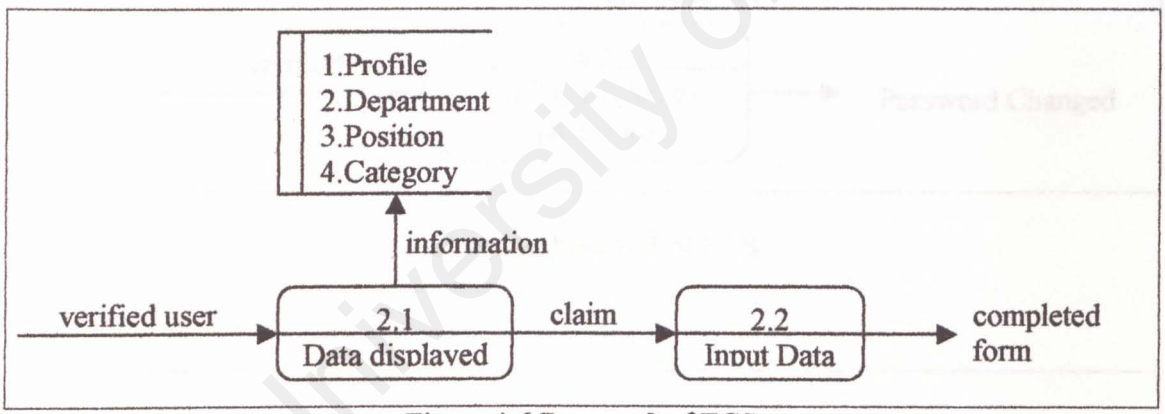



Figure 4.6 Process 2 of ECS

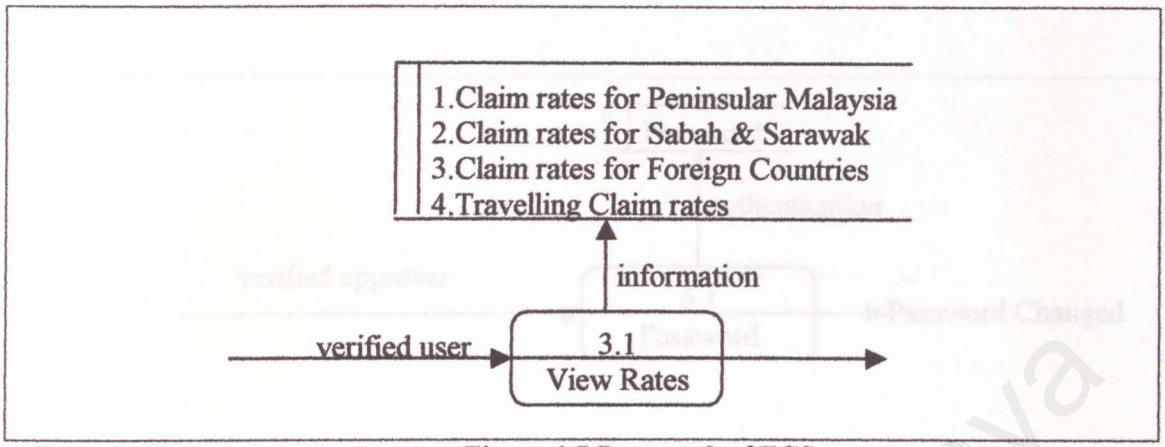



Figure 4.7 Process 3 of ECS

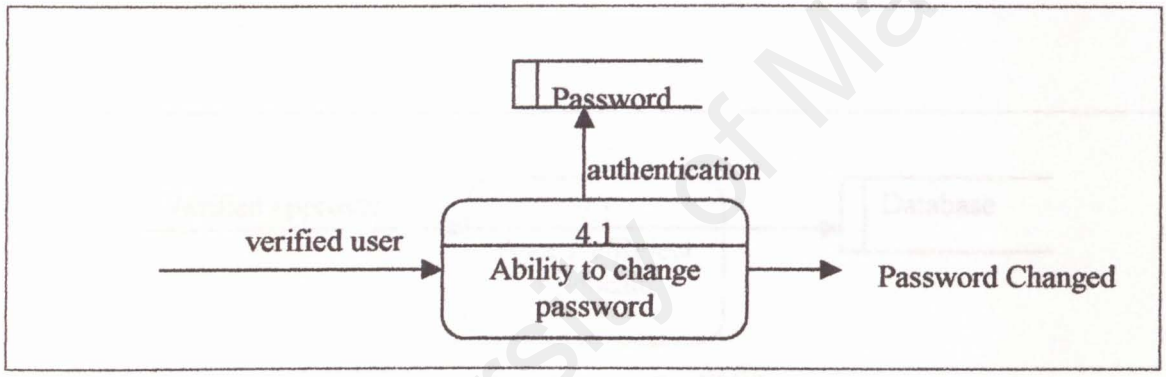



Figure 4.8 Process 4 of ECS

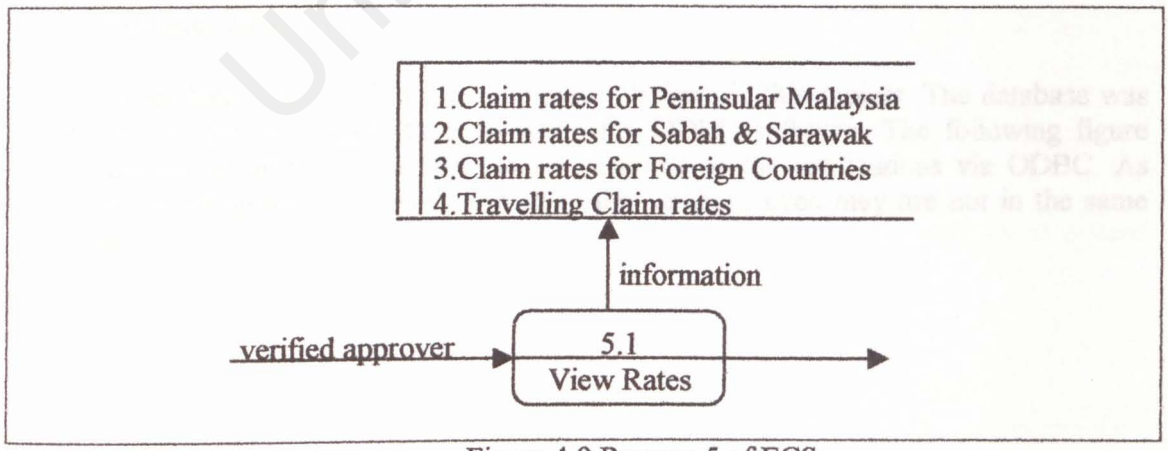



Figure 4.9 Process 5 of ECS

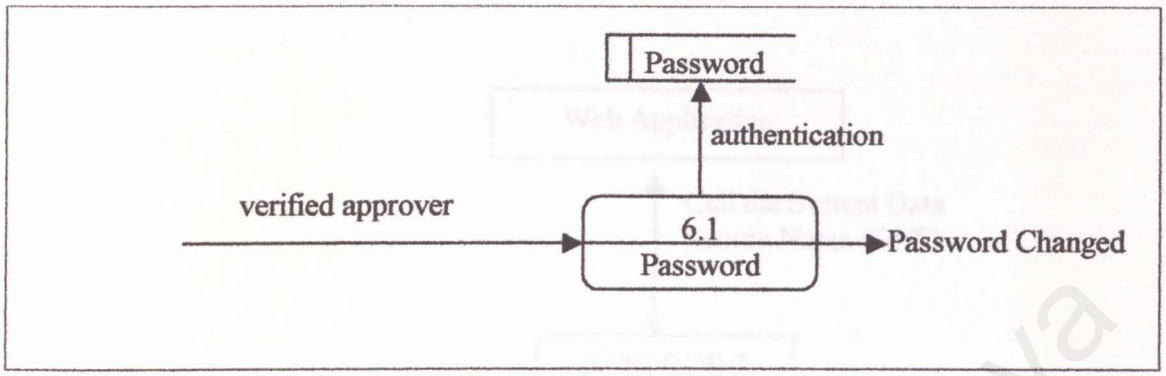



Figure 4.10 Process 6 of ECS

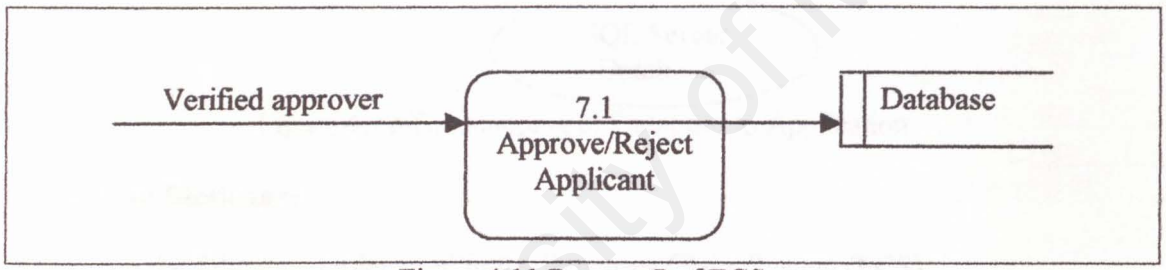



Figure 4.11 Process 7 of ECS

## 4.4 Database Design

### 4.4.1 Database structure

SQL Server 2000 was used as main database platform in this project. The database was connected to the web application by using the ODBC software. The following figure illustrates the mapping of the SQL server database to the applications via ODBC. As such, the applications can always access to the database even they are not in the same machine.

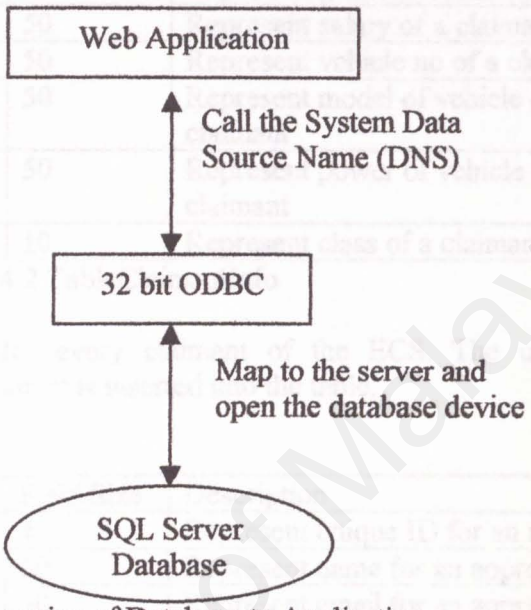



Figure 4.12 The mapping of Database to Application

### 4.4.2 Data Dictionary

These are the following tables used in the Expenses Claim System (ECS).

1. TableUserInfo

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| userID | Int | 4 | Represent unique ID for an user |
| vcUserID | Varchar | 50 | User Logon Name |
| vcPassword | Varchar | 50 | Uesr password |
| intLevelID | Smallint | 2 | 1-user 2-approver |

Table 4.1 TableUserInfo

This table stores the logon information for valid user of the ECS. The logon name is used during the authentication of the user to the system.

2. TableClaimantInfo

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| userID | Int | 4 | Represent unique ID for a claimant |

| vcName | Varchar | 50 | Claimant Name |
|---|---|---|---|
| intICNo | Varchar | 50 | Represent IC No claimant |
| vcDept | Varchar | 50 | Represent department of the claimant |
| vcEmail | Varchar | 50 | Represent email of a claimant |
| vcPosition | Varchar | 50 | Represent position of a claimant |
| vcGrade | Varchar | 50 | Represent grade of a claimant |
| intSalary | Varchar | 50 | Represent salary of a claimant |
| vcVehicleNo | Varchar | 50 | Represent vehicle no of a claimant |
| vcModel | Varchar | 50 | Represent model of vehicle of a claimant |
| vcPowerCC | Varchar | 50 | Represent power of vehicle of a claimant |
| vcClass | Char | 10 | Represent class of a claimant |

Table 4.2 TableClaimantInfo

This table holds a single record for every claimant of the ECS. The userID are automatically created when a new claimant is inserted into the table.

3. TableApproverInfo

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| userID | Int | 4 | Represent unique ID for an approver |
| vcApproverName | Varchar | 50 | Represent name for an approver |
| vcApproverEmail | Varchar | 50 | Represent email for an approver |
| vcApproverICNo | Varchar | 50 | Represent IC No for an approver |
| vcApproverAddress | Varchar | 50 | Represent address for an approver |

Table 4.3 TableApproverInfo

This table holds a single record for every approver of the ECS.

4. TableTransaction

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| claimID | Int | 4 | Represent unique ID for a claim |
| userID | Int | 4 | Represent unique ID for a claimant |
| typeClaim | Int | 4 | 1-Within Malaysia<br>2-Foreign Countries |
| loginDate | Datetime | 8 | Login date of the claim |
| loginTime | Varchar | 50 | Login time of the claim |
| status | Smallint | 2 | 1-In process 2- Approved<br>3- Rejected |

Table 4.4 TableTransaction

This is the main table, which stores the record of the claim application for every claimant. Each application are represented by a unique identifier, namely the "claimID" which is generated automatically when a new application record is inserted into the table.

5. TableClaimMalaysia

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| claimID | Int | 4 | Represent unique ID for a claim |
| dtApply | Datetime | 8 | Date of apply |
| country | Varchar | 50 | Country of claim application |
| claimDate | Datetime | 8 | Date of claim application |
| departure | Varchar | 50 | |
| arrival | Varchar | 50 | |
| destination | Varchar | 50 | |
| distance | Varchar | 50 | |
| fare | Varchar | 50 | |
| totalI | Varchar | 50 | |
| km | Int | 4 | |
| senperkm500 | Varchar | 50 | |
| RM500km | Varchar | 50 | |
| km650 | Int | 4 | |
| senperkm650 | Varchar | 50 | |
| RM650km | Varchar | 50 | |
| km800 | Int | 4 | |
| senperkm800 | Varchar | 50 | |
| RM800km | Varchar | 50 | |
| km950 | Int | 4 | |
| senperkm950 | Varchar | 50 | |
| RM950km | Varchar | 50 | |
| km1100 | Int | 4 | |
| senperkm1100 | Varchar | 50 | |
| RM1100km | Varchar | 50 | |
| km1250 | Int | 4 | |
| senperkm1250 | Varchar | 50 | |
| RM1250km | Varchar | 50 | |
| km1400 | Int | 4 | |
| senperkm1400 | Varchar | 50 | |
| RM1400km | Varchar | 50 | |
| km1550 | Int | 4 | |
| senperkm1550 | Varchar | 50 | |
| RM1550km | Varchar | 50 | |
| km1700 | Int | 4 | |
| senperkm1700 | Varchar | 50 | |
| RM1700km | Varchar | 50 | |
| kmafter1700 | Int | 4 | |
| senperkmafter1700 | Varchar | 50 | |

| | | | |
|---|---|---|---|
| RMafter1700km | Varchar | 50 | |
| totalII | Varchar | 50 | |
| meal | Int | 4 | |
| mealperday | Varchar | 50 | |
| RMmeal | Varchar | 50 | |
| daily | Int | 4 | |
| dailyperday | Varchar | 50 | |
| RMdaily | Varchar | 50 | |
| totalIII | Varchar | 50 | |
| hotelrent | Int | 4 | |
| hotelperday | Varchar | 50 | |
| RMhotel | Varchar | 50 | |
| receipthotel | Varchar | 50 | |
| RMtax | Varchar | 50 | |
| lodging | Int | 4 | |
| lodgingperday | Varchar | 50 | |
| RMlodging | Varchar | 50 | |
| totalIV | Varchar | 50 | |
| miscellanousClaim | Varchar | 50 | |
| receiptNo | Varchar | 50 | |
| totalV | Varchar | 50 | |
| totalclaim | Varchar | 50 | |

Table 4.5 TableClaimMalaysia

This table stores the claim information within Malaysia.

6. TableClaimForeign

| Field Name | Field Type | Field Size | Description |
|---|---|---|---|
| claimID | Int | 4 | Represent unique ID for a claim |
| dtApply | Datetime | 8 | Date of apply |
| dtDeparture | Datetime | 8 | |
| timeDeparture | Varchar | 50 | |
| dtArrival | Datetime | 8 | |
| timeArrival | Varchar | 50 | |
| country | Varchar | 50 | |
| dtArrivalCountry | Datetime | 8 | |
| timeArrivalCountry | Varchar | 50 | |
| meal | Int | 4 | |
| mealperday | Varchar | 50 | |
| RMmeal | Varchar | 50 | |
| daily | Int | 4 | |
| dailyperday | Varchar | 50 | |
| RMdaily | Varchar | 50 | |
| totalII | Varchar | 50 | |
| hotelrent | Int | 4 | |

| | | | |
|---|---|---|---|
| hotelperday | Varchar | 50 | |
| RMhotel | Varchar | 50 | |
| receipthotel | Varchar | 50 | |
| RMtax | Varchar | 50 | |
| lodging | Int | 4 | |
| lodgingperday | Varchar | 50 | |
| RMlodging | Varchar | 50 | |
| totalIII | Varchar | 50 | |
| miscellanousClaim | Varchar | 50 | |
| receiptNo | Varchar | 50 | |
| totalIV | Varchar | 50 | |
| dtMalaysia | Datetime | 8 | |
| departure | Varchar | 50 | |
| arrival | Varchar | 50 | |
| destination | Varchar | 50 | |
| distance | Varchar | 50 | |
| taxifare | Varchar | 50 | |
| totalV | Varchar | 50 | |
| km500 | Int | 4 | |
| senperkm500 | Varchar | 50 | |
| RM500km | Varchar | 50 | |
| km650 | Int | 4 | |
| senperkm650 | Varchar | 50 | |
| RM650km | Varchar | 50 | |
| km800 | Int | 4 | |
| senperkm800 | Varchar | 50 | |
| RM800km | Varchar | 50 | |
| km950 | Int | 4 | |
| senperkm950 | Varchar | 50 | |
| RM950km | Varchar | 50 | |
| km1100 | Int | 4 | |
| senperkm1100 | Varchar | 50 | |
| RM1100km | Varchar | 50 | |
| km1250 | Int | 4 | |
| senperkm1250 | Varchar | 50 | |
| RM1250km | Varchar | 50 | |
| km1400 | Int | 4 | |
| senperkm1400 | Varchar | 50 | |
| RM1400km | Varchar | 50 | |
| km1550 | Int | 4 | |
| senperkm1550 | Varchar | 50 | |
| RM1550km | Varchar | 50 | |
| km1700 | Int | 4 | |
| senperkm1700 | Varchar | 50 | |
| RM1700km | Varchar | 50 | |

| | | | |
|---|---|---|---|
| kmafter1700 | Int | 4 | |
| senperkmafter1700 | Varchar | 50 | |
| RMafter1700km | Varchar | 50 | |
| totalVI | Varchar | 50 | |
| totalclaim | Varchar | 50 | |

Table 4.6 TableClaimForeign

This table stores the claim information for foreign countries.

# CHAPTER 5:
# SYSTEM IMPLEMENTATION

## 5.1 Overview

System implementation is an important process that converts the system requirements and design into program code. It is important to ensure the stage where the developer has managed to come up to.

## 5.2 Development Environment of ECS

Development environment has certain impact on the development of a system. Using the suitable hardware and software not only helps to speed up the systems development but also to determine the successful of the project.

### 5.2.1 Hardware Requirement

The system is to be designed based on a Graphical User Interface(GUI) concept in order to provide simpler and more interactive interfaces between the system and the users. Generally, Windows 2000 will be the preferred choice due to its availability in the college's computer laboratory and also at home.

### 5.2.2 Software Requirement

In general , there are two categories of software tools required in development of this system. The categories of tool are listed below:-

a) Tools for constructing the system

i) Windows 2000

Operating system used as a platform in developing the system

ii) Microsoft Visual Interdev 6.0

This software is used in the process of creating the user interface and writing codes for the system

iii) Microsoft SQL Server

It is mainly used to create tables to store some information that would be retrieved in regards to certain actions.

b) Tools for documentation purposes

i) Microsoft Word 2000

Acts as word processor

## 5.3 Maintenance Measures

Once this ECS has been implemented, periodic maintenance of this system may be very necessary in order to ensure its continual efficiency and reliability. Maintenance has to take place to make sure that the service provided are always satisfactory. The process of maintenance may initially take place once every month. During the maintenance process, all the hardware and equipment are tested to see if they are in proper condition. As for the system itself all the operations are expected to see if they are working accordingly. If any problems are detected, they are looked into as soon as possible. After some time, when the system's usability and security is assured, the maintenance of the system would be conducted in a wider time frame ( for example, once every 2 months).

The maintenance may largely involve the database maintenance. The records especially the claim rate for each type of claim has to be up to date. Besides that, users information have to be updated to ensure data accuracy. When these maintenance procedures are adhered, the system would always be on the save side and the rate of performance would be in the state of satisfaction to all users.

### 5.4 Documentation

Documentation is a set of written description that explain to a reader what a program does and how they do it. User manual is a reference guide for system users on how to handle the system.

### 5.5 Summary

System development is where all major functions are in a workable state. The main aspect in this stage is to do all the necessarily enhancement to upgrade the design.

# CHAPTER 6:
# SYSTEM TESTING

## 6.1 Overview

The test of the ECS is basically done throughout the prototype model. Generally the system id tested for any bugs and problem that may be existing without realization. As a result of all this, a test plan is worked out so that there would be a base for which the person testing the system could look at. Basically, the test plan of this ECS consists of six distinguishable testing methods. The techniques referred here are the following.

## 6.2 Unit Testing

Unit test was conducted on the smallest unit of the system to detect errors within the boundary of a single program module. It was performed at each stage of the implementation phase. The test cases cover errors such as typographical error, initialization error, incorrect variable names and inconsistent data types. The various buttons and input fields are tested to see if they produce the expected results.

## 6.3 System Functionality Testing

Once the unit test is complete, the testing phase then proceeds a step further into system functionality testing. Here the major functions were tested to ensure that they perform the right task as expected. The following descriptions describe in detail some of the major functions that were tested.

### 6.3.1 Display User's Information

This is practically the first function, which was tested. In this testing, a dummy database was first created. The database contains user information which includes name, department, position, IC No, grade/category, class, user name, password and etc. Here, the function of displaying the accurate user's information when their authentication is verified was tested.

### 6.3.2 Password

This is basically the function that helps the user to change their password when it is necessary. This particular function is carefully tested over and over again to make sure it is reliable. In the process of testing this function, a particular user's password is changed and the system is expected to verify the password, which is entered twice, and to be displayed accordingly to the task's status.

### 6.3.3 Claim Rate, Rules and Regulations

As for this particular function, the accessing of the required web site is tested with the University of Malaya's internet address. This is done to verify the right web site is accessed.

### 6.3.4 Database accessing

The database is accessed when the user accesses to claim form. The claim rate for meal, lodging and traveling is displayed accordingly to the destination of the trip, user's category and user's class. Here, the database which is accessed is checked thoroughly to

make sure that all the information displayed are accurate. The system is also checked to see if the right table of the database is being accessed at a particular time.

### 6.3.5 Computation

This is to make sure that the system does the calculation for total amount correctly and accurately.

## 6.4 System Integration Testing

Functionality testing ensures that each program modules perform the correct function. However it does not guarantee that the program will function properly as it is intended to when each of these modules are integrated into a single working system. There may be situations where data may be lost or wrongly parsed during interfacing and thus the program will fail to produce the desired results or the expected performance. As a result, integration testing comes into the picture. The integration testing is the testing procedure that is actually carried out by the developers themselves. In this testing perspective, the integration between all modules in the system would be cohesively tested over and over again. The integration testing is carried out using incremental integration, where the program is tested in smaller segments rather than testing the program as a whole in the earlier stages. An incremental integration test enable errors to be located easily and this approach is more systematic, manageable and controllable. There are three main issues in the integration testing process. They are as follow:-

a) Corrective

This is the process of actually searching for errors and bugs that may still be present in the system. Here, all the input accepting procedures would be thoroughly tested to seek for any bugs.

b) Adaptive

This refers to all the necessary changes that may be made to the system, if there happen to be any external forces that may have caused it. For instances, if there happen to be any changes in the claim rate, the system would be updated accordingly.

c) Perfectness

As for this process, it is actually referring to any enhancement that may take place at the end of the systems completion. This process is also concerned with any changes.

The scenario of the integration testing for this system is as follow:

- An additional module is added to the main module and then tested.
- The process continues by adding in the rest of the modules incrementally.
- When a new module is added, it is tested to see if the correct function procedures are called as needed.
- The system is also tested to see if the correct module is called upon a button click.
- In this system, the functionality of each and every module of the system is tested again once all the modules are integrated.

## 6.5 Graphical User Interface Testing

This is basically a testing for specialized environments and application that uses a window system. The following elaborates the test cases were carried out during the GUI test in order to ensure that the interface settings and appearance are performed as expected.

a) All menu options and buttons perform the functions that it was designed for, such as log in, moving to next or previous screen and moving to others modules.

b) Each menu option is addressable by mouse.

c) All menu option and command buttons shared standardized setting, where they use the same font type, size, color and shape. The shape of all buttons is standardized and the commands use consistent naming through out the program.

d) All command buttons are checked and found properly working. They perform the correct operations and produce the intended results.

e) The system messages and instructions are displayed according to the right event as designed.

f) The color and graphic variations used are ideal and attractive enough to gain peoples intention.

## 6.6 User Testing

The user testing is the testing process of the system which is carried out by the users. As for the testing of this system, the categories of users are laid out to be students from Faculty of Computer Science and Information Technology. The reason why IT literate

students are taken into picture is that , there would be a high chance of them providing good feedback in regards to this system.

Although, the system is mainly intented for the staff of Faculty of Computer Science and Information Technology, it was not that feasible to actually get these group of people to test the system. In order to maintain professionalism and also to obtain informative feedback from those who tested the system, a set of questionnaires was laid.(Refer to Appendix)

### 6.6.1 Checklist for the user testing

a) Inform user of the testing time and place

b) Give users a general idea regarding the content and purpose of the system.

c) Prepare the questionnaires needed.

d) Prepare a program executable(exe).

## 6.7 Debugging Techniques

This section provides an explanation on the general build-in debugging function that was used for conducting all the testing described earlier. Below are some of the debugging techniques, which were adopted for this kiosk system:

### 6.7.1 Single-stepping

Single stepping enable the program to be executed one line at a time in order to locate the line that produced an error. This method is very useful in tracing the program flow. By

stepping through each program code, we can check if the processing is following the correct path. Beside this, it is useful in checking for syntax error, typing mistakes or declaration/initiation error. During single stepping, it is also easier to examine the contents of certain critical variables, to ensure their values are set correctly. The variable values can be examined with a "watch window". Nevertheless, conducting single-stepping can difficult, as it is time and effort consuming to check the codes line by line. Thus it was mainly used to verify the program logic.

### 6.7.2 Watch Window

The purpose of the watch window os to "watch" a particular value, variable, result of expression during runtime. It allows the state of the variable to be examined during the execution of a program. When combined with the single stepping technique, watch window becomes a very useful tool for locating both syntax and logical error that may be existing in the program. Logical errors are those statements that are legally correct, but the arithmetic precedence may have been wrongly defined. This problem often goes unnoticed until a runtime problem arises.

### 6.7.3 Breakpoint

A breakpoint enables a flag to be set at a particular program line which tells the compiler where to stop the compilation process. This feature provides the capability to jump skip through a bunch of intermediate codes and point to the function that is suspected to have an error directly, avoiding the hassle of line execution.

## 6.8 Summary

System testing help to ensure that the code implemented are designed properly that is the users need are considered in. It ensures that the system does what the user wants it to do.

# CHAPTER 7:
# SYSTEM EVALUATION

## 7.1 Overview

The state of success in carrying out the project can be measured based on the number of objectives that have been met and also based on the systems scope of proposal.

All the main functions of the system are considered successful. The system managed to conform to all the functions. The functional and non-functional requirements are satisfactory. Most of the expected features were successful, except for the idea of an online system. This was not successful due to the limitation time but this system works well on computers, which are connected through Local Area Network (LAN).

The HCI and GUI features were also satisfying. The user interface was widely accepted by those who tested the system. Nevertheless, the area of HCI is very large and there are always ways to upgrade and make interactions between human and computer much better. In term of consistency, the system could be considered successful because the entire screens were designed accordingly with very little variations.

As a conclusion, the system is generally successful but with additional time, ideas and resources, this system could contribute even more.

## 7.2 System Strength

a) User-friendly interface

The ECS's interface is very user friendly and all the modules are equipped with a easy access. The flow of the system is easy to follow. Here, users are not required to follow any complex procedures in performing a task.

b) User Authentication

ECS is a system which is equipped with authentication control where users are required to key in user name and password in order to have access to the system. Users are able to customize their password instead of generated by the system. Users are able to change their password to ensure their information is secured.

c) Pop-up messages

Users are informed the current status of a specific task through pop-up messages throughout the processes done. This keeps users informed of their requested task.

d) Database maintenance

Administrators are given the permission to maintain the database. They are able to view, add, delete and update the records.

e) Information retrieval from database

Users are only required to input some of the relevant information that are needed to retrieve data from the database.

### 7.3 System Limitation

Although this system is considered to be generally successful and satisfying, there are some drawbacks and limitations.

Firstly, the system can only run under windows environment due to the tools used to develop the system.

Lastly, this system does not provide users the help facility if it is needed. If the system is able to contain the help function it would most probably gain much acceptance.

### 7.4 System Enhancements

If this system was to be actually implemented, certain enhancements and additional features could be added tremendously. It is to make the system more advance and easy to use. The process of developing a system has no boundaries as new requirements and better implementation methods continue to rise and evolve. To enhance the system performance, the following suggestions is considered to be part of the system future enhancement that could extend the mobility of the developed system.

a) Once the system could not verify the user password, the user name and password should be locked rather than just denying the access to the user to have a more secured system.

b) Users must change their password at least once in a month. The system should be able to alert this to the users.

c) The flexgrid that are used to key in miscellaneous and public transport fare and distance should be more flexible where users should be provided with combo box.

d) Visual help should be provided to users.

### 7.5 Summary

System evaluation helps in determining the system strength and weakness in order to improve system in future to produce a more reliable system.

# CHAPTER 8: CONCLUSION

## 8.1 Problem Encountered

a) Gathering information

The existing process of claiming which is done manually is not processed by one staff only. The task of processing the claimants claim form are divided among the staff. So the probability of a staff to know the whole process of processing the claim form is less. This has made the process of gathering information hard. Each staff has to be interviewed on order to get the whole idea of this claiming process.

b) Developing the system

There were problems when developing the system. For example, the system does not work as expected or give the right results to a users request. These are overcomed by referring back to the codes, friends and books.

## 8.2 Learning Experience

Throughout the entire duration of the project, there were several things that I have learnt. Firstly, I have understood that Human Computer Interaction and proper graphical user interfaces plays an important role. My research on HCI and GUI has benefited me a lot in the sense that I now know how good working systems should be designed so that it would gain acceptance all the way through.

I have also learnt that in order for a system to succeed well and not fail, all the designs of the system will need to ensure consistency, compatibility of users

expectations, predictability, adaptability, error prevention, user control and as well as a cohesively structured system at all times.

I have also learnt that each stage of the systems lifecycle is critically important and there has to be a certain amount of effort, time spent to ensure that all the stages of the lifecycle model are carefully comprehended and followed. The concept of being independent has also acknowledged itself. I know now how necessary it is to manage a given project carefully especially when it is an individual project. As this is not a group project, I have realized how important it is to have endurance and discipline all the way throughout the project timeline.

Previously all the major projects that I went through was mainly carried out in groups. As a result of this, I never really got to see the actually picture of stress, management, self motivation and endurance. However, the task of completing this final year project gave me new management skills, and most important of all endless discipline. I have also realized that proper planning is always vital and it reflects the end product.

Beside this, in terms of programming, I can now say that I'm pretty familiar with Active Server Pages. This project has certainly gave me enough training in the arena of developing a strong cohesive system.

The final thing that I have learnt is that proper time management and patience is always necessary in order to make sure that the end result is of satisfactory manner. Patience is important in terms of facilitating to various users. This is due to the fact that, different users would most likely have different requirement and this requires the systems developer's careful thinking , coordination and programming skills to facilitate each and every one.

### 8.3 Summary

This system is basically an expenses claim system that helps the staff to perform a better and easy claiming process. The system ensures the authority of users to access to the system through user name and password validation. In the system, the users are able to access to claiming form within Malaysia and in foreign countries. Most of the information such as the user particulars and claim rates are displayed automatically as users key in the important information such as the user name and password and selecting a country respectively. The system would let the user to change the password when needed and they can also view the claim rate from the website. This system could be considered as a system that would most likely benefit all the staff. Besides that, this system is also forecasted to gain peoples attention and acceptance.

# REFERENCE

1. AISB expenses claim form
URL: http://www.aisb.org.uk/forms/expenses_form.html

2. AgentLink expense claims
URL: http://www.agentlink.org/admin/expenses.html

3. Appendix 4: Expenses claim
URL: http://www.nw-kgw.demon.co.uk/hb_app4.html

4. Claim for Traveling Expenses
URL: http://finance.memphis.edu/forms/trav/trav02.htm

5. ANU CABS Council Members' expenses claim form
URL: http://www.anu.edu.au/cabs/council/claimform.html

6. Acadia University Travel Expenses Form
URL: http://www.secure.acadiau.ca/business/exp/intro.html

7. Queen's University Travel Expense Claim
URL: http://www.queensu.ca/secretariat/trustees/travel.html

8. CSUPERB Travel Expense Claim
URL: http://www.csuchico.edu/csuperb/TravExpClm.xls

9. CMS Travel Expense Claim
URL: http://www.cms.math.ca/Forms/travel/travelclaim.pdf

10. Signifo Expenses
URL: http://www.signifo.com/screen_help/login_page.htm

11. Kendall, Kenneth E., & Kendall, Julie E. (1999). System Analysis and Design. (4th ed.). New Jersey:Prentice-Hall.

12. Microsoft Active Server Pages
URL: http://msdn.microsoft.com/library/default.asp

13. Whitten, Jeffrey L., Bentley, Lonnie, Bentley D., & Dittman, Kevin C (2001). System Analysis and Design Methods. (5th ed). New York: McGraw-Hill.

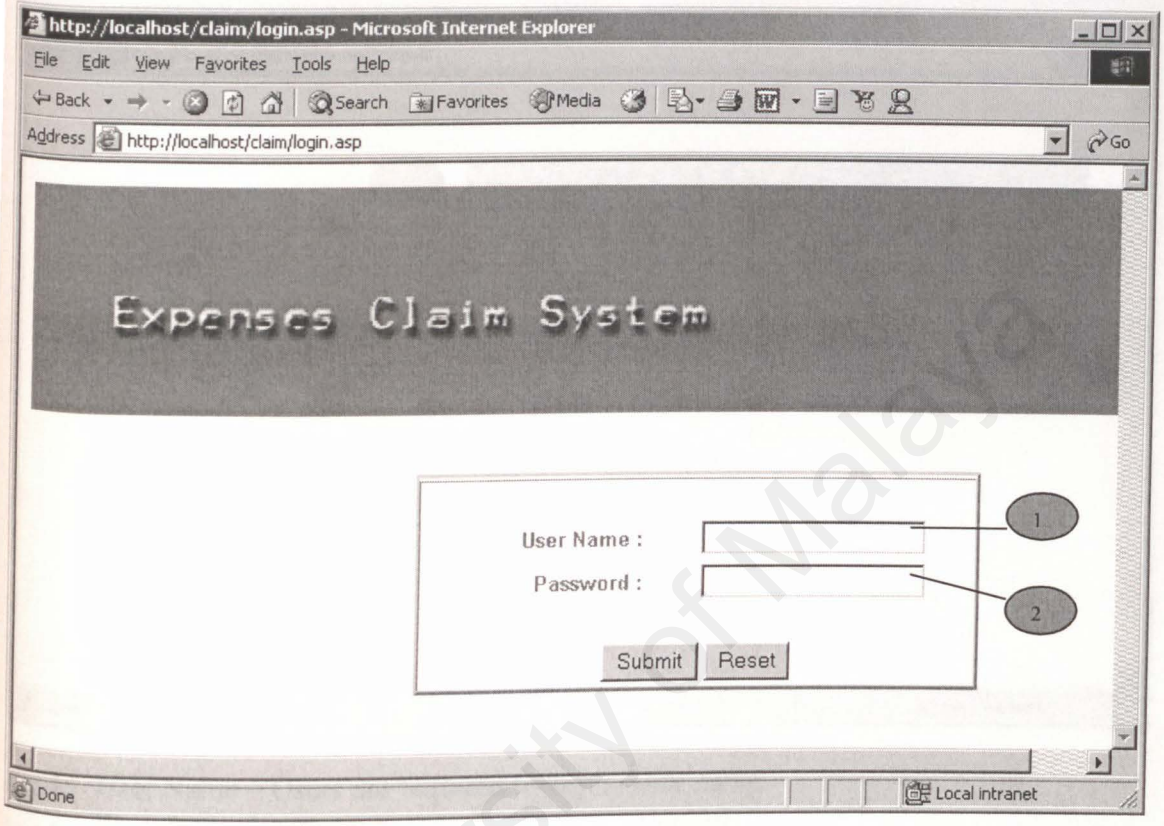
14. Chris Ullman, David Buser, Jon Duckett, Brain Francis, John Kauffman, Juan T. Llibre, David Sussman.(1999) Beginning Active Server Pages 3.0. Wrox Press Ltd.

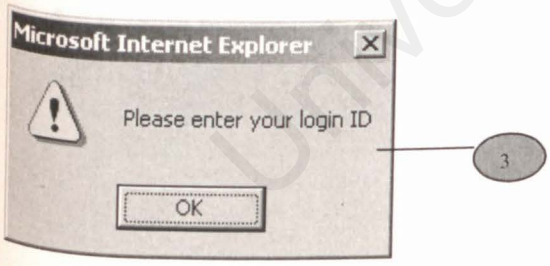
15. http://www.powerasp.com/content/hintstips/asp-email.asp

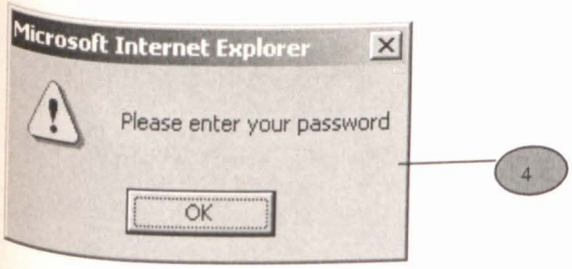
# USER MANUAL

# MAIN

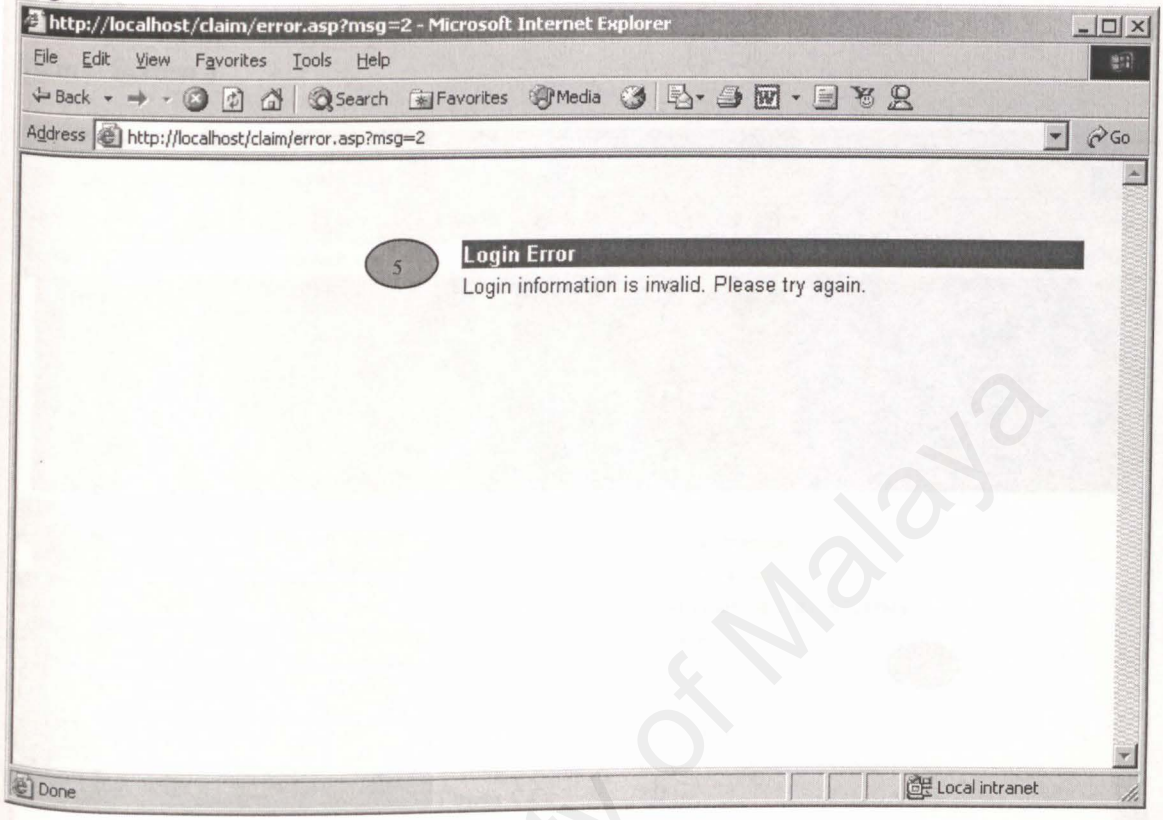
## Login – Screen 1



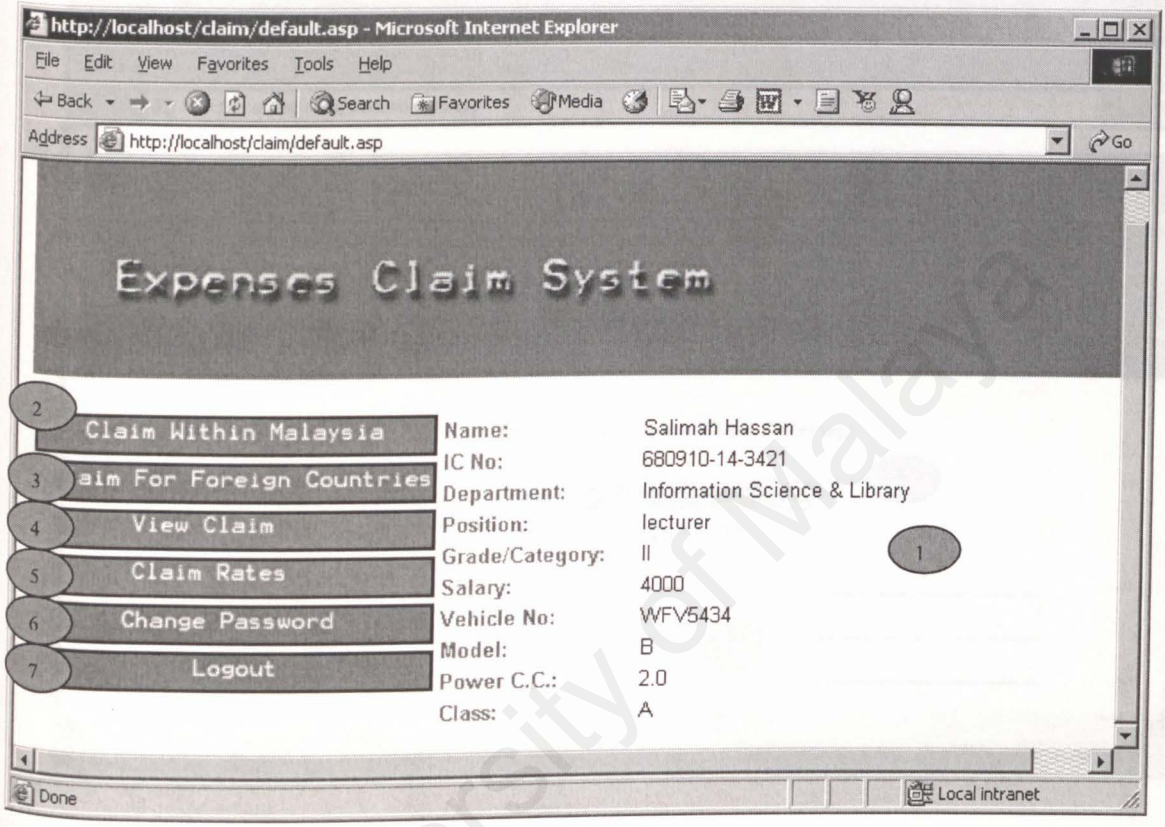
Login – Screen 2




1. User Name – Users are required to key in user name.
2. Password – Users are required to key in password.
3. If users did not key in their user name, alert message will be pop up.
4. If users did not key in their password, alert message will be pop up.
5. If login information is invalid, login error message will be shown.

# USER

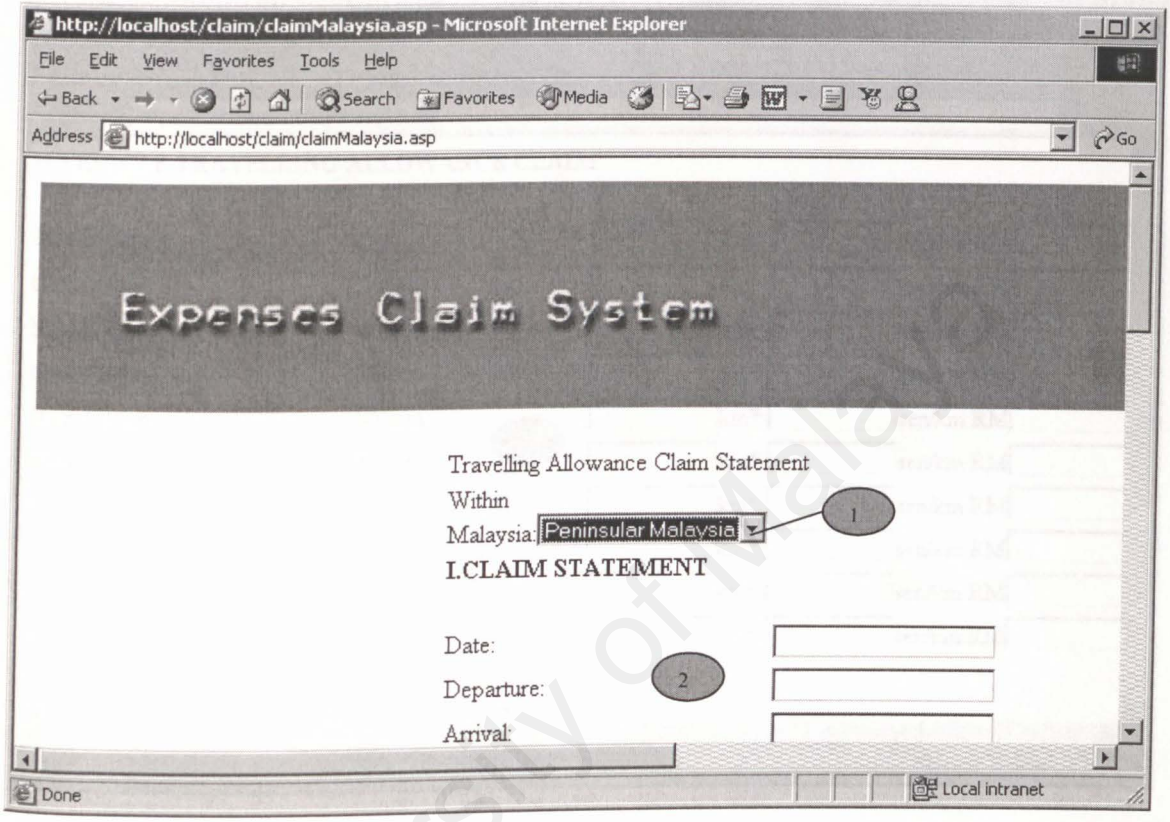
Main – Screen 1




1. Users' Information – Users information are displayed. These information are retrieved from database based on the user name and password.
2. Claim Within Malaysia – User are able to access to Claim Within Malaysia Form.
3. Claim For Foreign Countries – Users are able to access to Claim For Foreign Countries Form.
4. View Claim – Users can view the previous claim which have been applied by the users.
5. Claim Rates – Users can view the claim rates from website.
6. Change Password – Users are able to change their password.
7. Logout – Logout from the system.

# USER

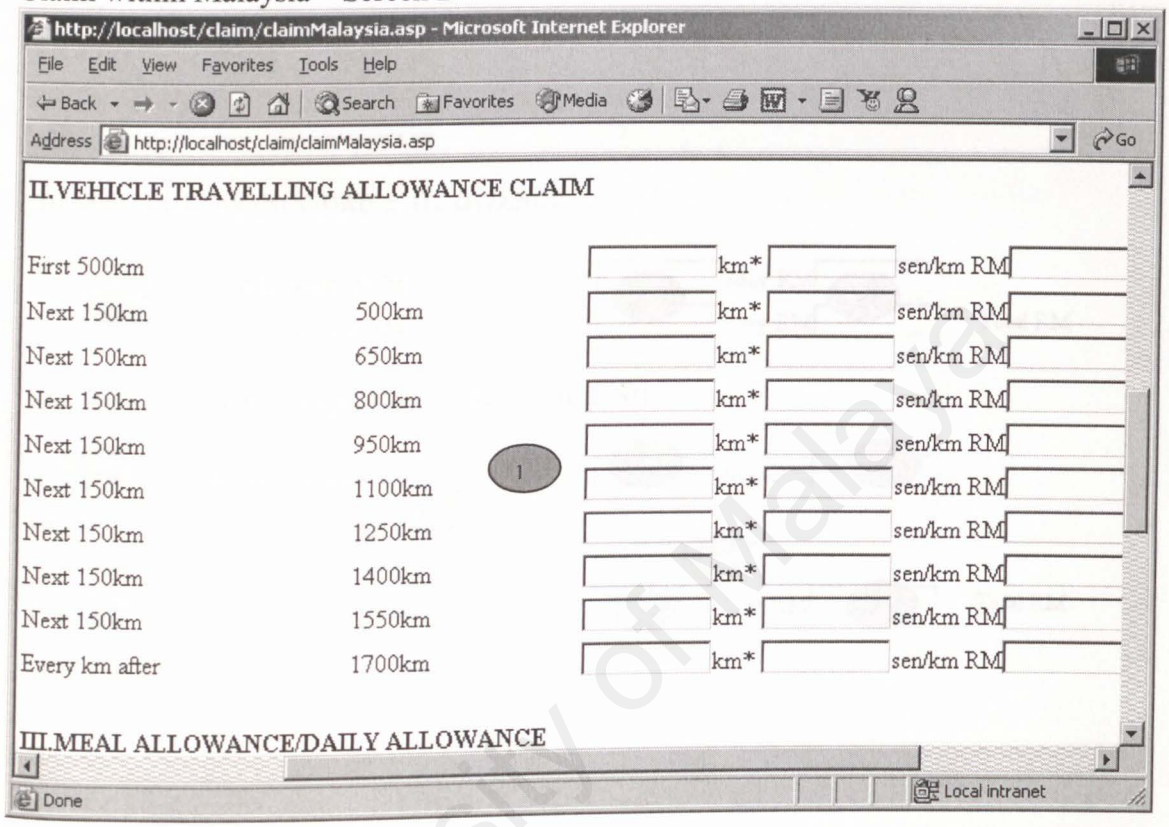
Claim within Malaysia – Screen 1




1. Country within Malaysia – Country within Malaysia includes Peninsular Malaysia, Sabah and Sarawak are displayed once the combo box is clicked.
2. Users are required to key in the traveling information which includes the date, departure time, arrival time, destination to, distance, transportation fare and total fare.

# USER

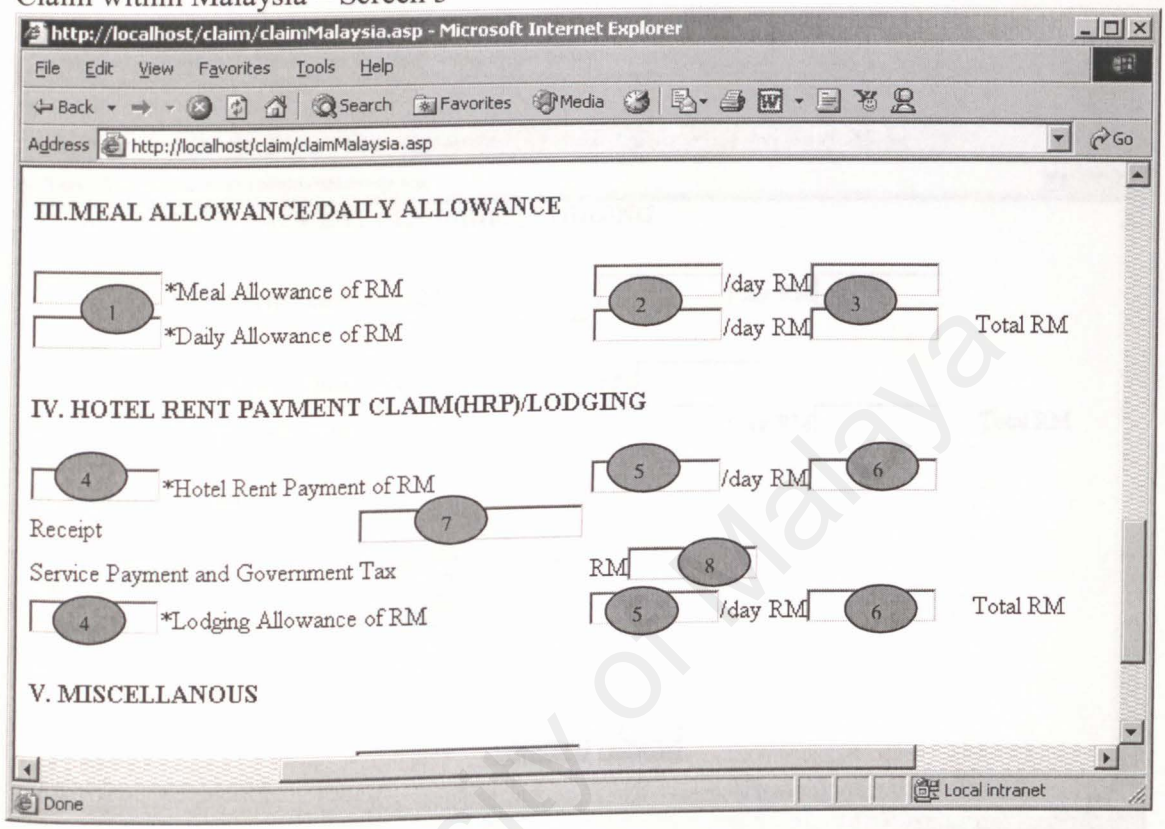
Claim within Malaysia – Screen 2




1. Vehicle Traveling Allowance Claim – Users are supposed to key in relevant information.

# USER

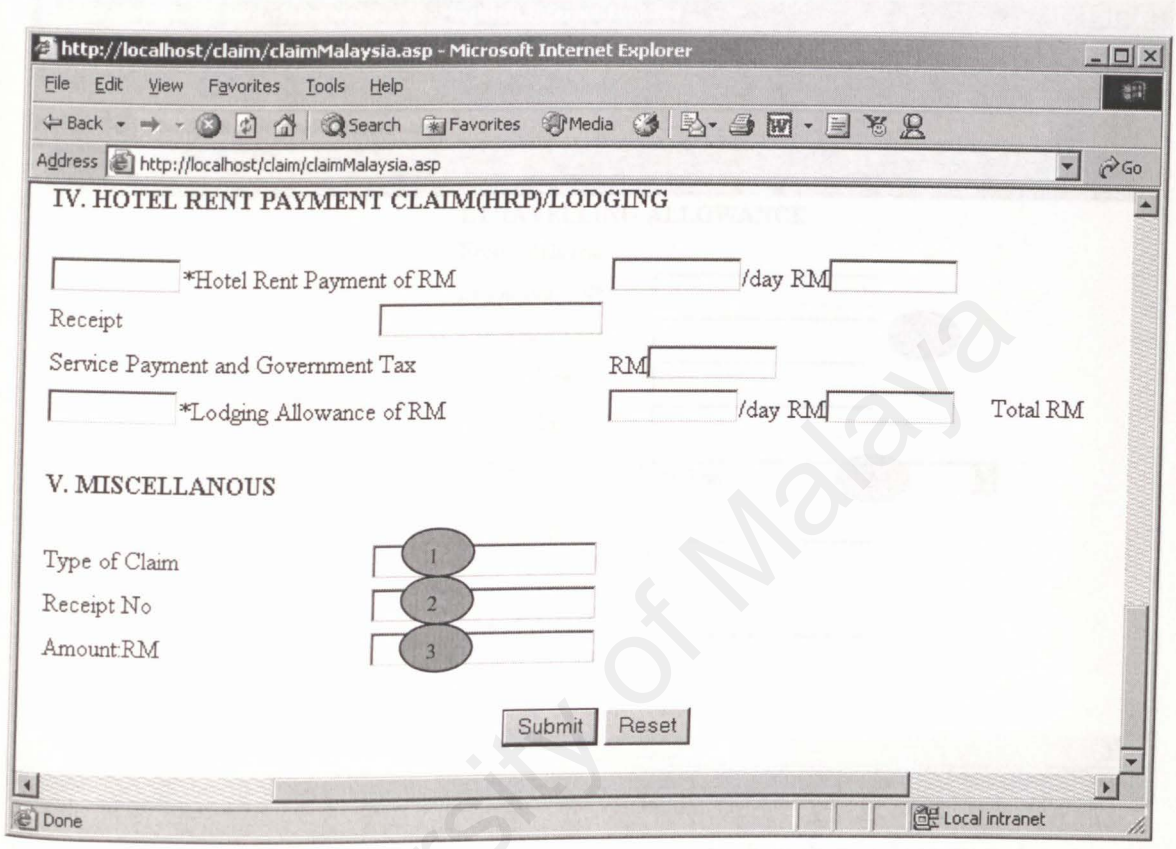
Claim within Malaysia – Screen 3




1. Number of days for the particular allowance.
2. Claim Rates – Users are required to key in the claim rates according from the website.
3. Total amount is calculated.
4. Number of days for the particular allowance.
5. Claim Rates – Users are required to key in the claim rates according from the website.
6. Total amount is calculated.
7. Users are required to key in receipt no.
8. Users are required to key in service payment and government tax.

# USER

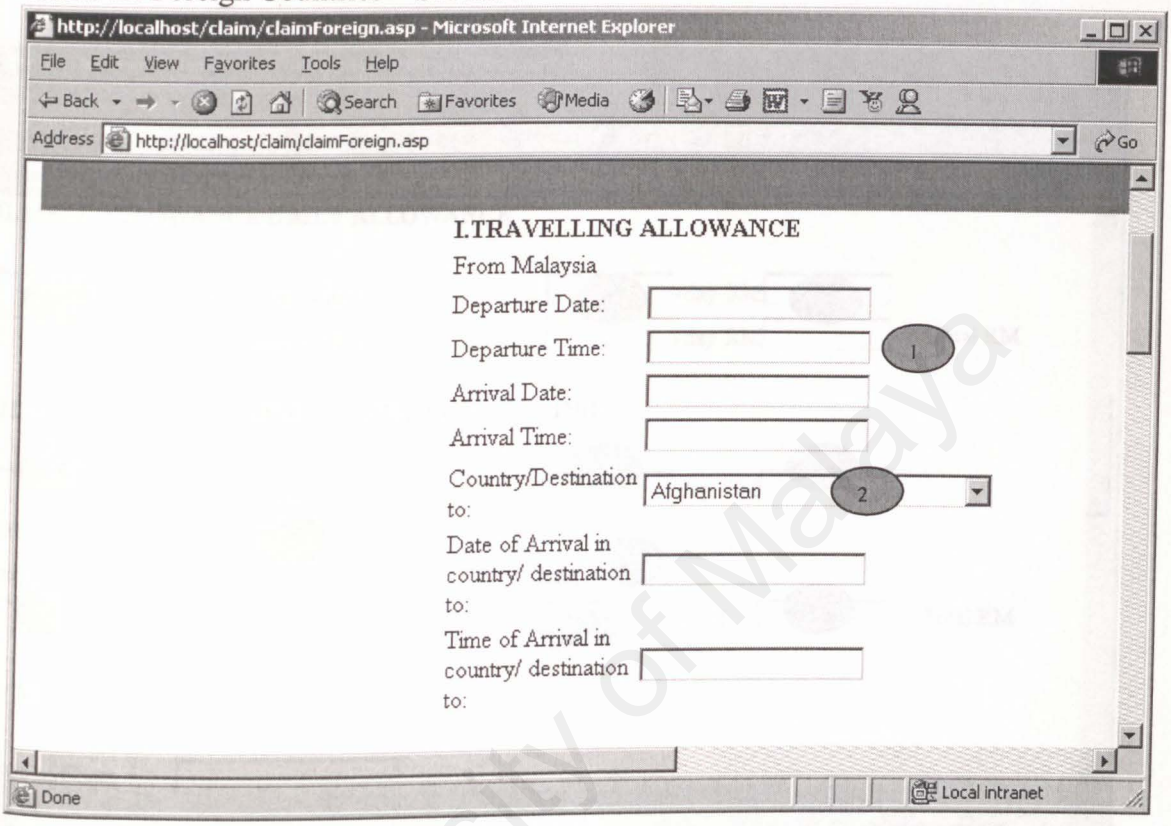
Claim within Malaysia – Screen 4




1. Users are required to key in the miscellaneous claim which includes the type of claim (Toll, Car Park, Laundry, etc)
2. Users are required to key in receipt no.
3. Users are required to key in the amount of miscellaneous claim.

# USER

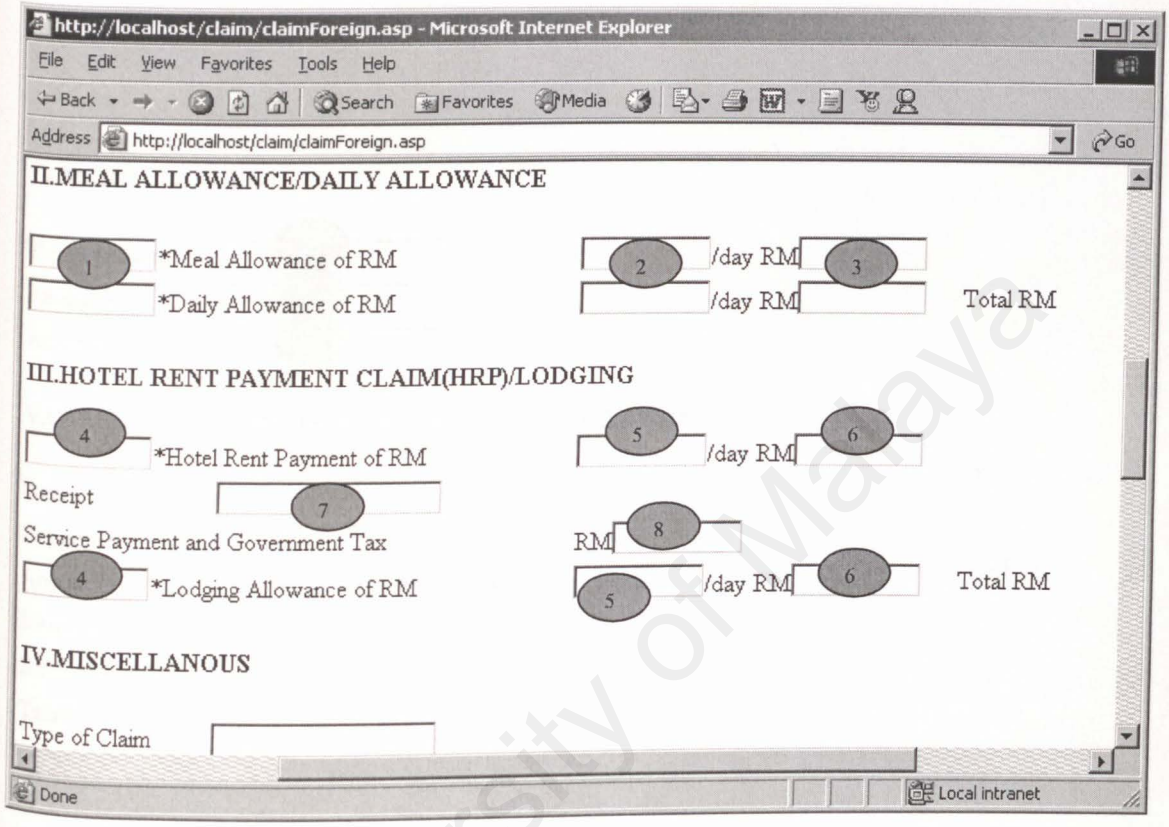
Claim for Foreign Countries – Screen 1




1. Users are required to key in relevant information which includes departure date, departure time, arrival date, arrival time, date of arrival in country and time of arrival in country.
2. Foreign countries are displayed once the combo box is clicked.

# USER

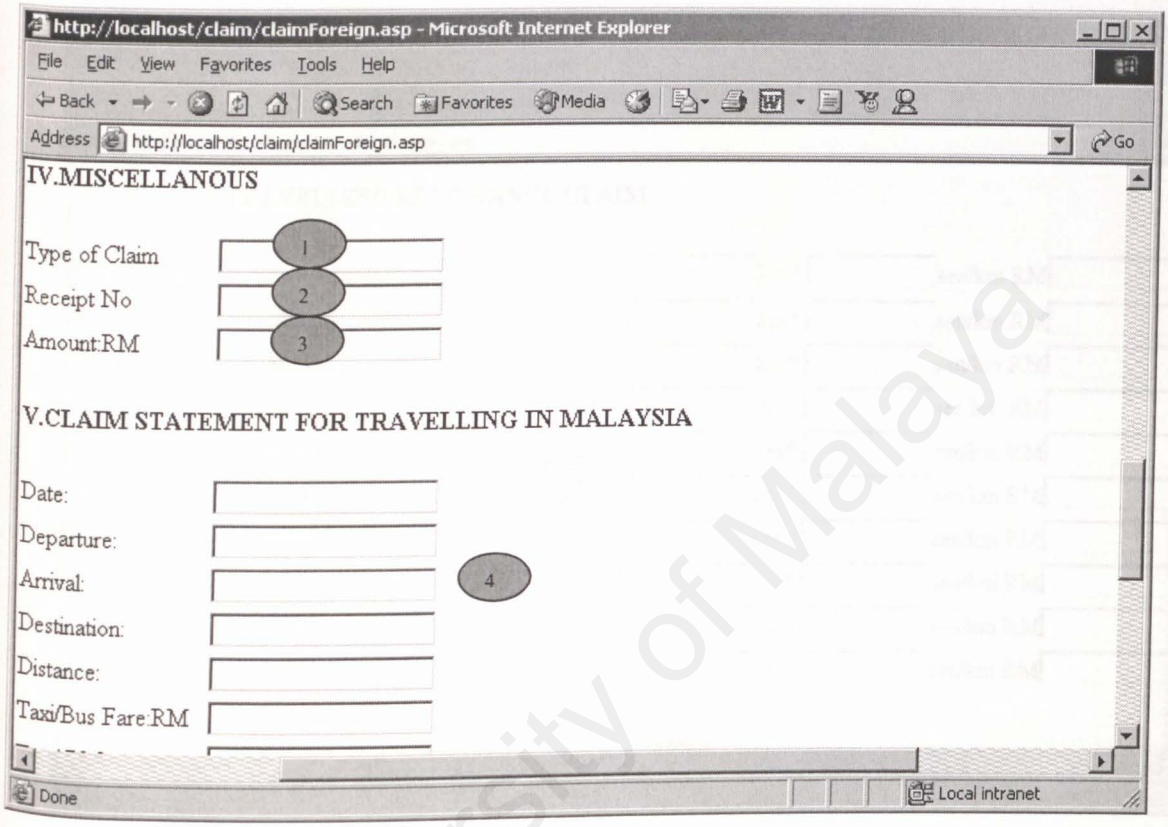
Claim for Foreign Countries – Screen 2




1. Refer to page 79 note1.
2. Refer to page 79 note2.
3. Refer to page 79 note3.
4. Refer to page 79 note4.
5. Refer to page 79 note5.
6. Refer to page 79 note6.
7. Refer to page 79 note7.
8. Refer to page 79 note8.

# USER

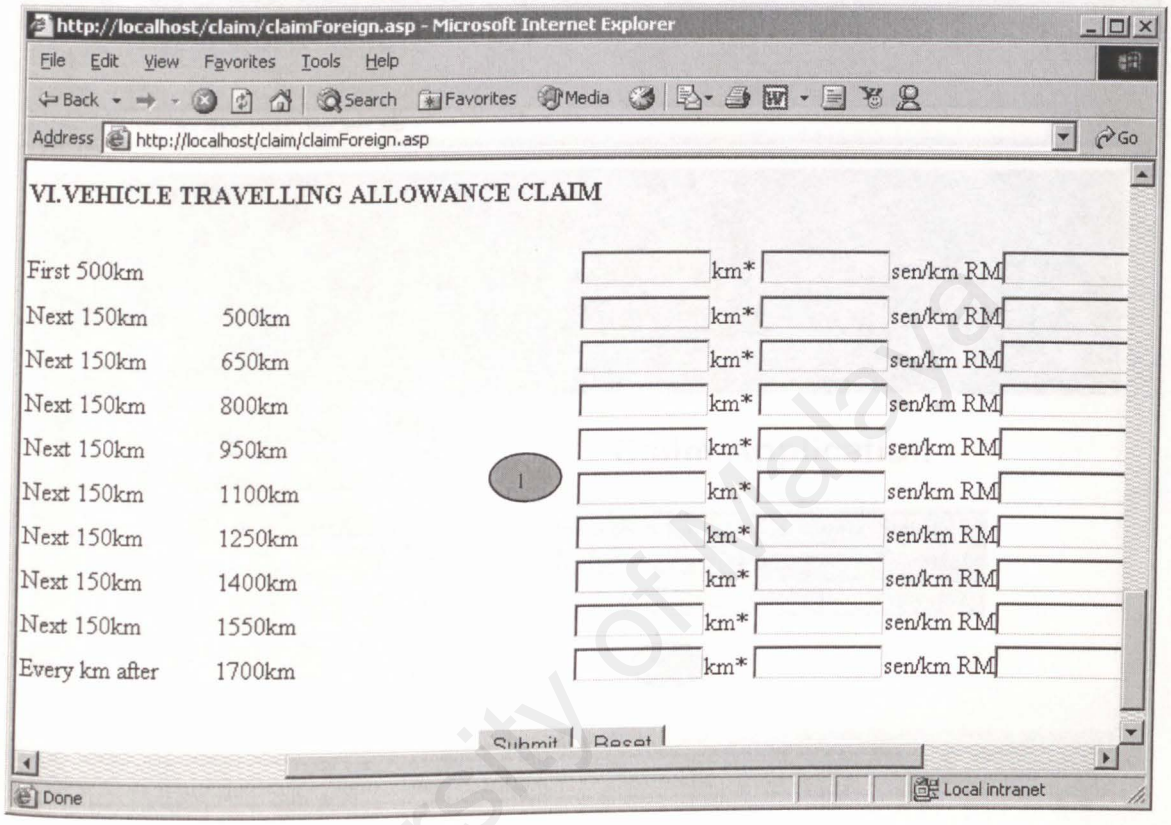
Claim for Foreign Countries – Screen 3




1. Refer to page 80 note1.
2. Refer to page 80 note2.
3. Refer to page 80 note3.
4. Users are required to key in information which includes date, departure time, arrival time, destination, distance, transportation fare and total fare.

# USER

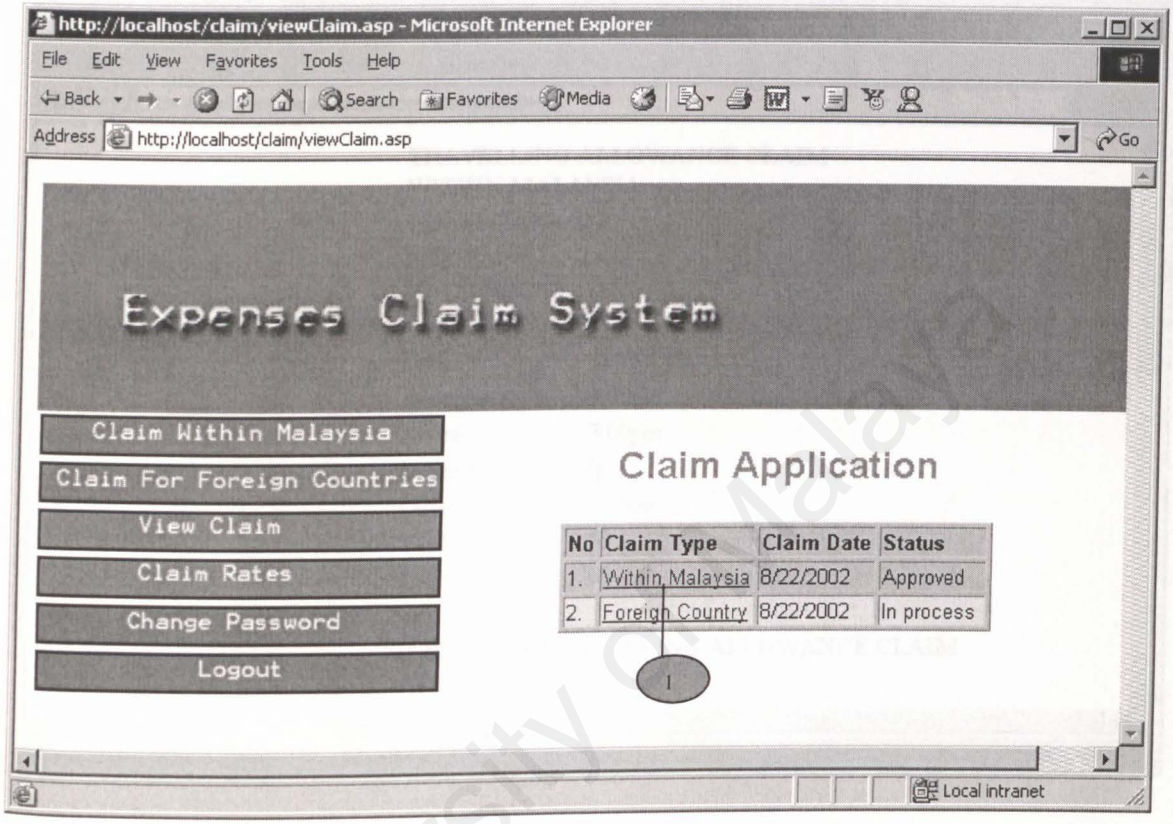
Claim for Foreign Countries – Screen 4




1. Vehicle Traveling Allowance Claim – Users are supposed to key in relevant information.

# USER

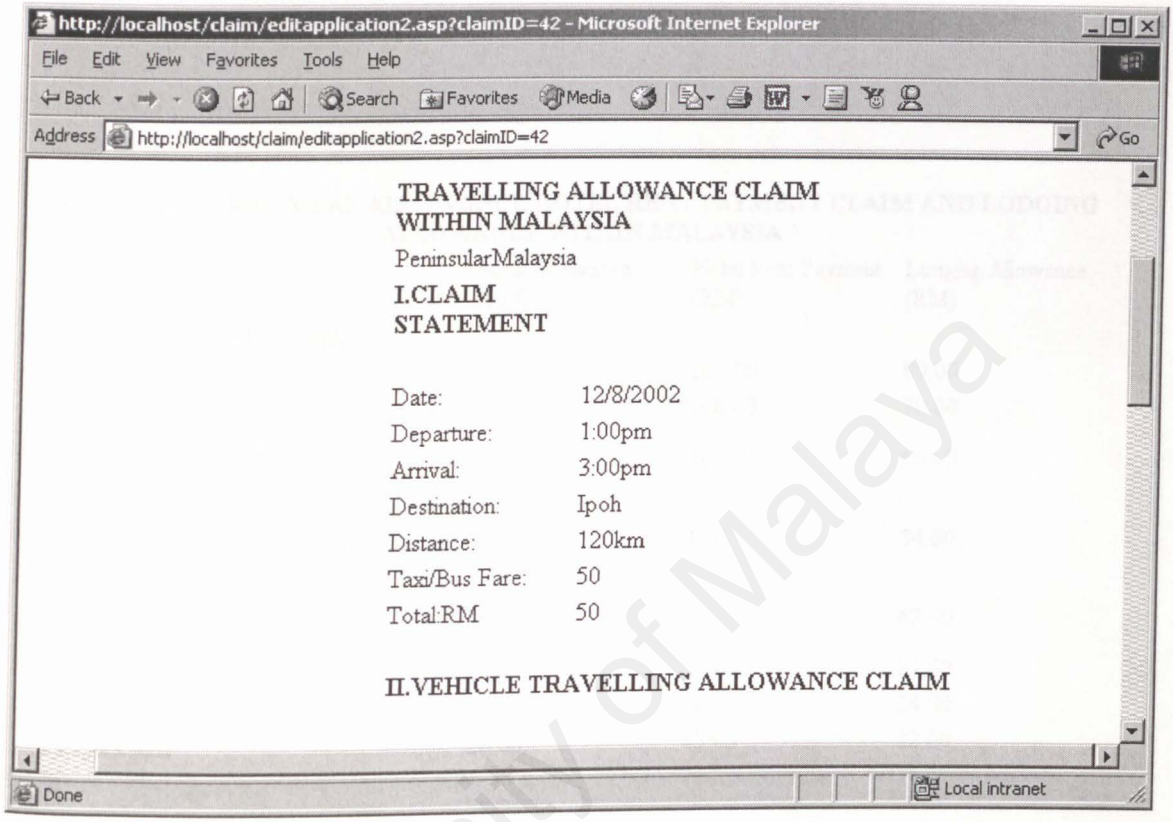
View Claim




1. Users are able to view full claim information once the link is clicked.

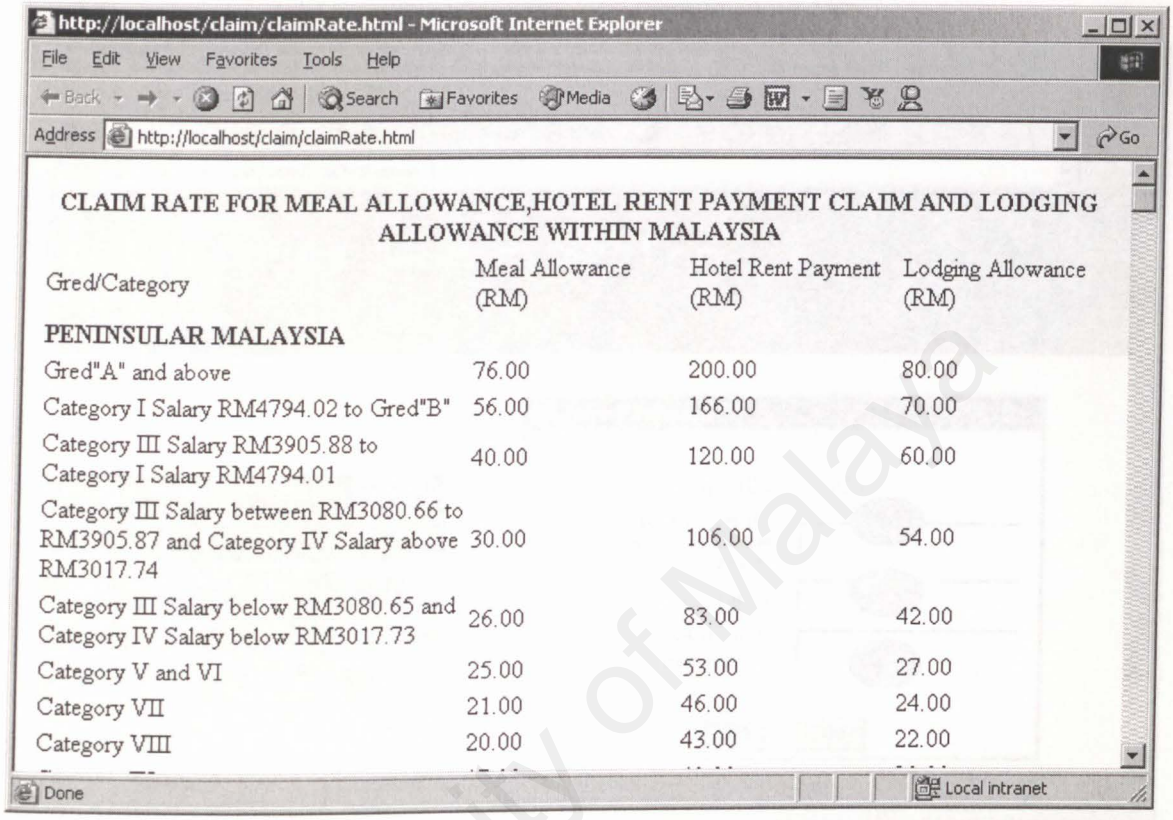
# USER

View full claim information



# USER

## Claim Rates

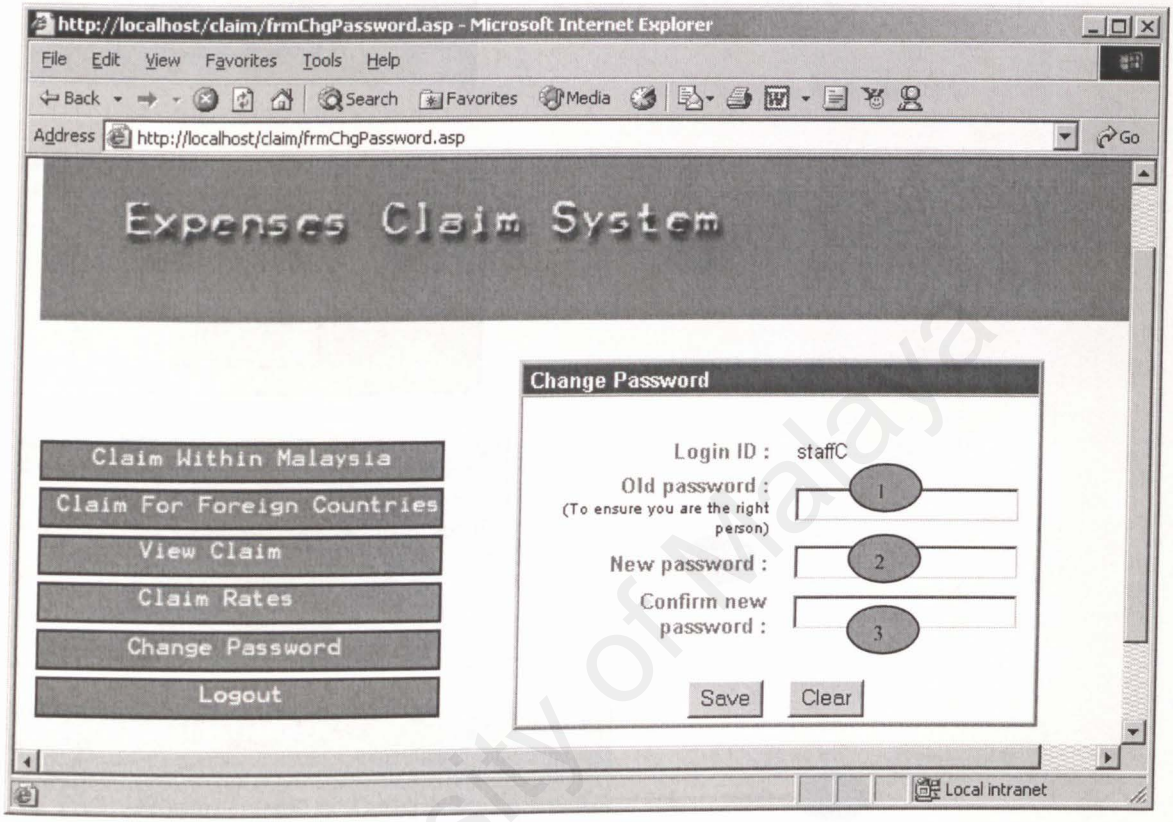



**CLAIM RATE FOR MEAL ALLOWANCE,HOTEL RENT PAYMENT CLAIM AND LODGING ALLOWANCE WITHIN MALAYSIA**

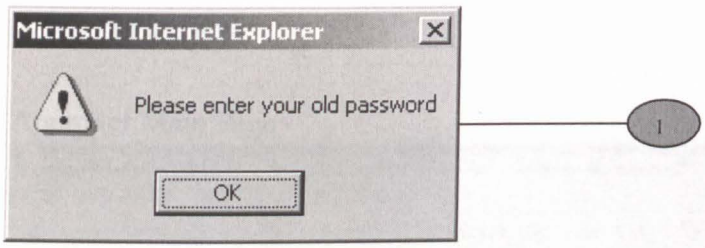
| Gred/Category | Meal Allowance (RM) | Hotel Rent Payment (RM) | Lodging Allowance (RM) |
|---|---|---|---|
| **PENINSULAR MALAYSIA** | | | |
| Gred"A" and above | 76.00 | 200.00 | 80.00 |
| Category I Salary RM4794.02 to Gred"B" | 56.00 | 166.00 | 70.00 |
| Category III Salary RM3905.88 to Category I Salary RM4794.01 | 40.00 | 120.00 | 60.00 |
| Category III Salary between RM3080.66 to RM3905.87 and Category IV Salary above RM3017.74 | 30.00 | 106.00 | 54.00 |
| Category III Salary below RM3080.65 and Category IV Salary below RM3017.73 | 26.00 | 83.00 | 42.00 |
| Category V and VI | 25.00 | 53.00 | 27.00 |
| Category VII | 21.00 | 46.00 | 24.00 |
| Category VIII | 20.00 | 43.00 | 22.00 |

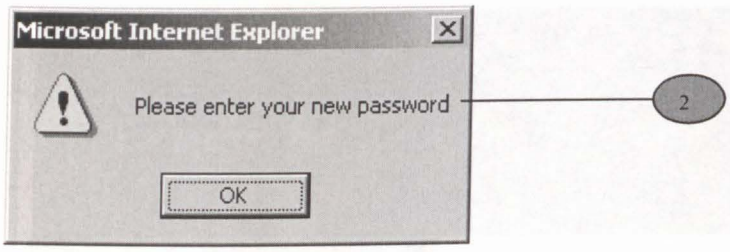
# USER

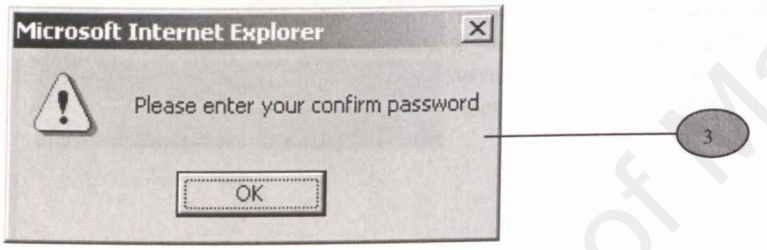
Change Password Screen

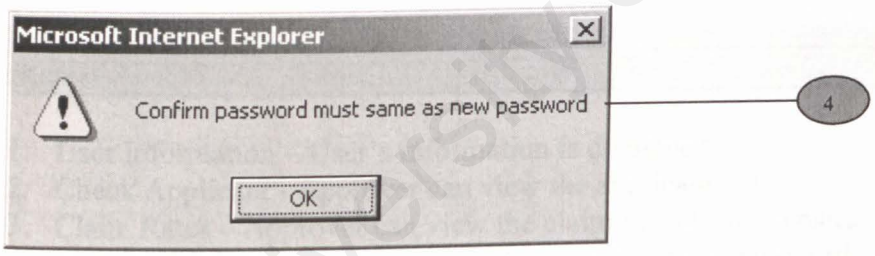



1. Old Password – Users are required to key in the old password.
2. New Password – Users are required to key in the new password.
3. Confirm Password – Users are required to confirm the new password.



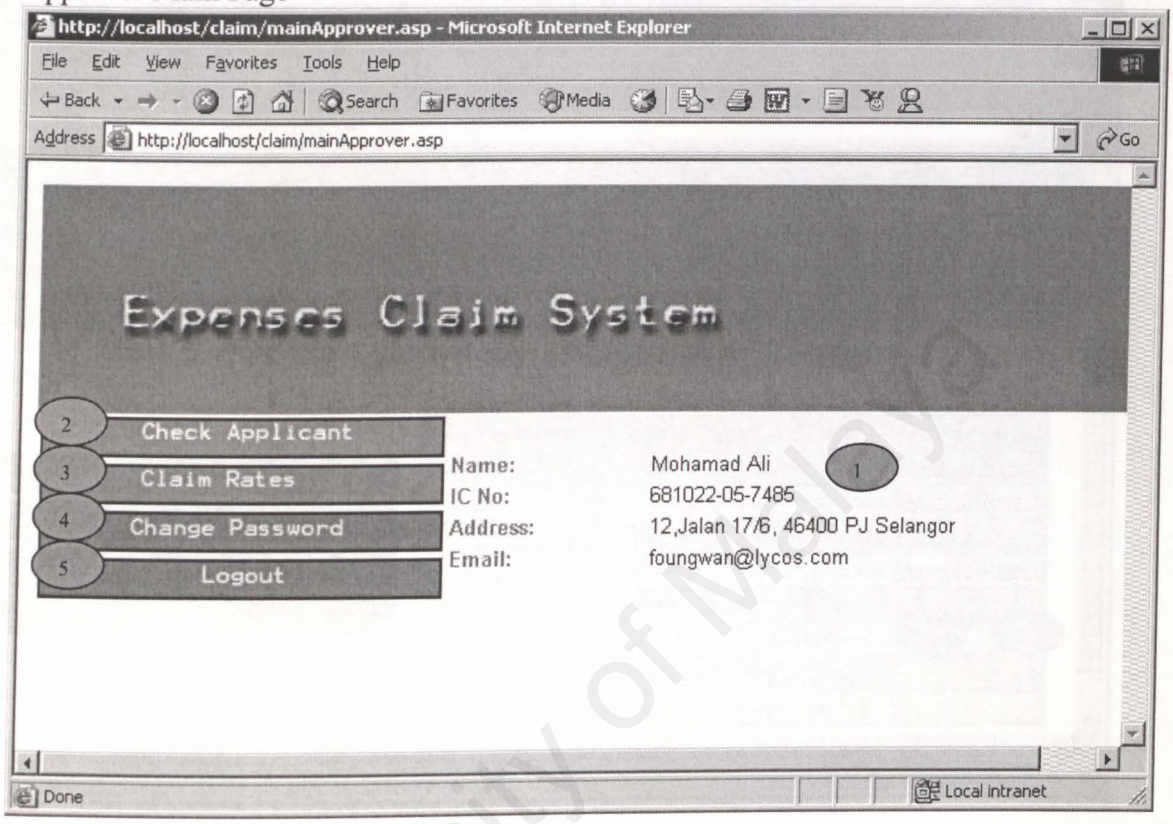




1. If users did not key in their old password, alert message will be pop up.
2. If users did not key in their new password, alert message will be pop up.
3. If users did not key in their confirm password, alert message will be pop up.
4. If the confirm password and new password does not same, alert message will be pop up.

# APPROVER

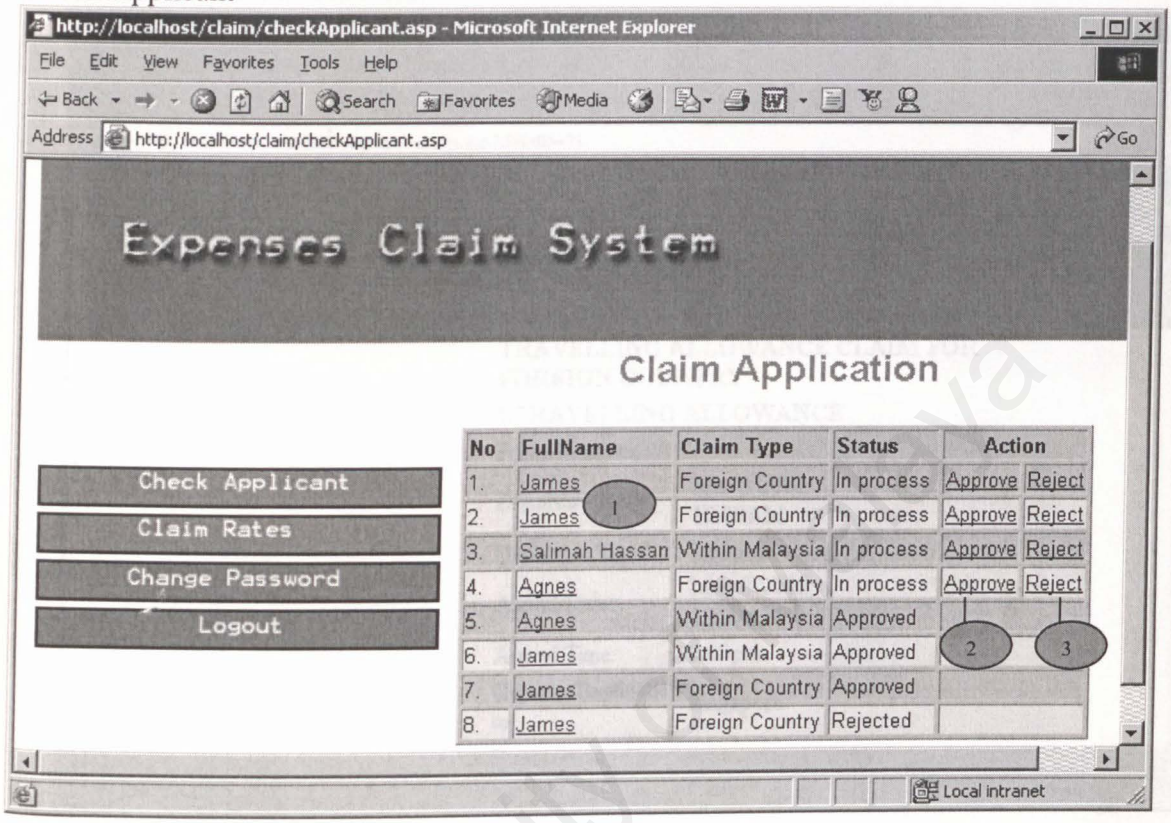
Approver Main Page




1. User Information – User's information is displayed
2. Check Applicant - Approver can view the applicant list.
3. Claim Rates – Approver can view the claim rates from website.
4. Change Password – Approver is able to change their password.
5. Logout – Logout from the system.

# APPROVER

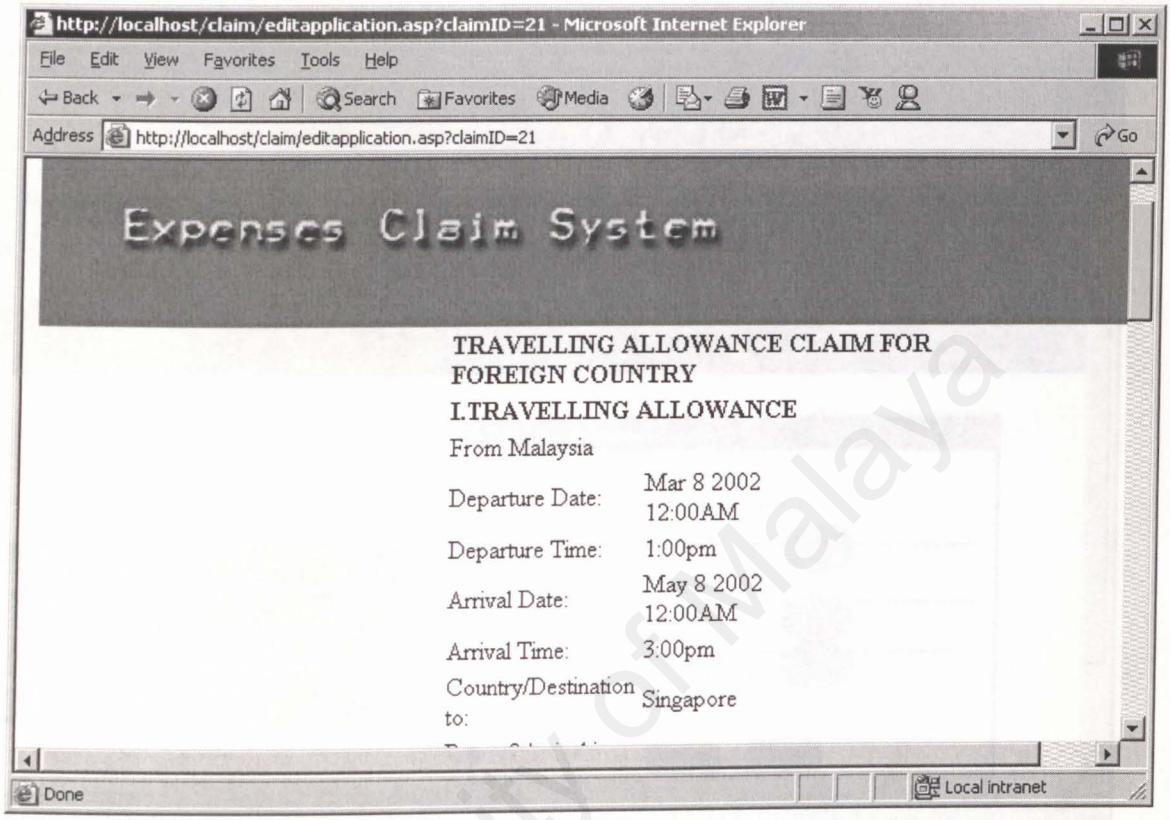
## Check Applicant




1. Approver is able to view full claim information once the link is clicked.
2. Approver can approve the claim once the link is clicked.
3. Approver can reject the claim once the link is clicked.

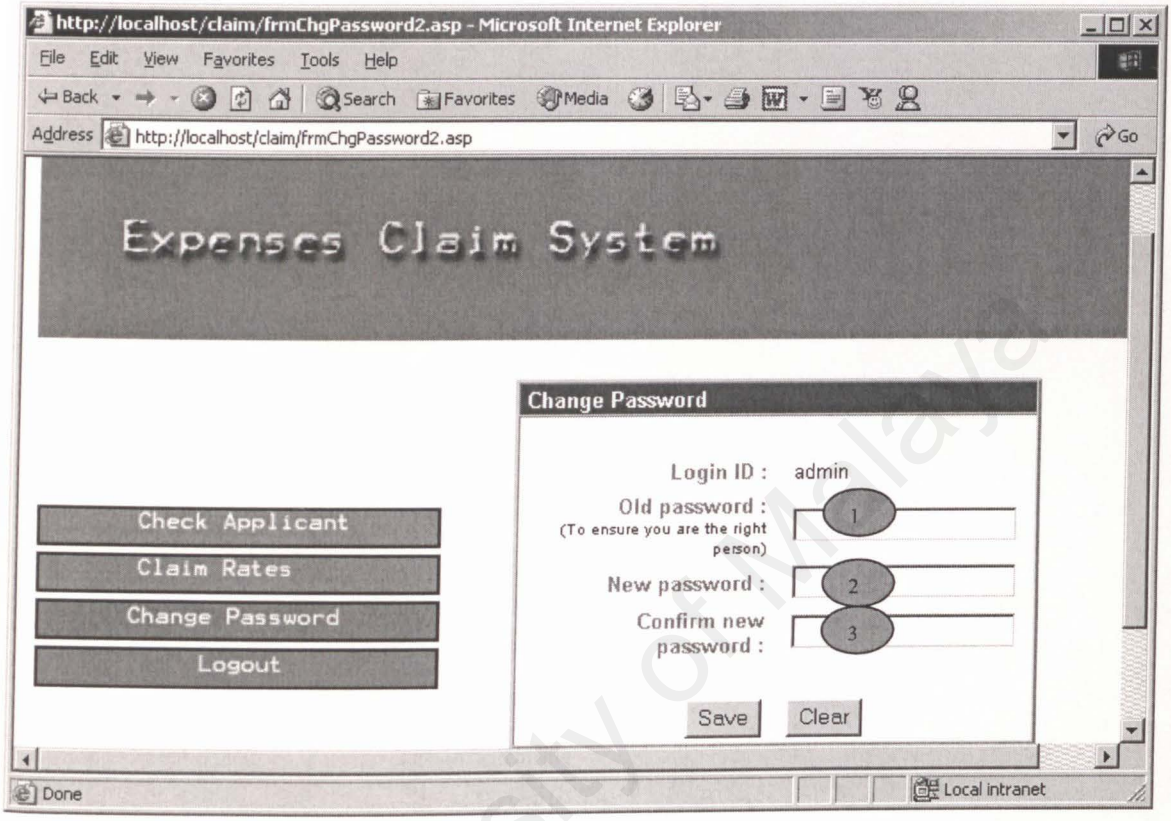
# APPROVER

View full claim information



# APPROVER

## Change Password Screen




1. Refer to page 88 note 1.
2. Refer to page 88 note 2.
3. Refer to page 88 note 3.